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Journal of Educational Research

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JOURNAL *of* EDUCATIONAL RESEARCH

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PROFESSOR TERMAN'S DETERMINISM: A REJOINDER

WILLIAM C. BAGLEY
Teachers College, Columbia University

In the JOURNAL OF EDUCATIONAL RESEARCH for June, 1922 Professor Terman does me the honor to discuss editorially certain parts of the paper on "Educational Determinism," which I read at the Chicago meeting of the Society of College Teachers of Education.

I have to thank Professor Terman for the clearness with which he has summarized my principal charges against the group of specialists in mental measurements whom I characterized as educational determinists. I am glad to learn that he repudiates the clear implications of the paragraph that I cited from one of his books relative to educational differentiation at the age of twelve on the basis of assumed vocational destinies as determined by the I.Q., and that he disclaims for himself and his fellow-workers the editorial statement that I quoted from one of their technical journals to the effect that the school does not really educate so much as it certifies to educability. I may also be permitted at this point sincerely to reaffirm my warm appreciation of Professor Terman's sterling contributions to the science of education—an appreciation which, I am glad to say, has been publicly expressed on more than one occasion.

It is, therefore, only with the keenest regret that I find myself still at variance with Professor Terman in respect to the far-reaching questions which the subject under discussion involves. I may have "read a meaning into the words of the 'determinist' which was never intended" (Dr. Terman's editorial, p. 60).

The "intention" of the determinists whose writings I quoted I had but one means of judging—namely, the words in which they expressed themselves. I labor under the same limitation in attempting through a study of Professor Terman's editorial to correct what may have been an error and a possible consequent injustice in my earlier paper. Notwithstanding his disclaimers, it seems to me that his brief and "breezy" reply to my rather serious charges fully confirms my earlier conviction that the determinists, because of their hereditarian preconceptions, are grossly misinterpreting the facts which the measurements have revealed.

I do not think, for example, that one who is not pretty thoroughly obsessed by such preconceptions would use a false and misleading analogy with reference to so important a matter as that which is involved in the "right of the individual to share in the spiritual life of the race."[1] It was and is my contention that this right should not be invaded or invalidated short of the most conclusive proof that the individual is quite incompetent to avail himself of his share in the human heritage. Professor Terman accuses me of thus "resting my case on the logical impossibility of proving a 'universal negative.'" And then, utterly to rout me, he points triumphantly to the fact that "no one has ever proved the impossibility of life returning forty-eight hours after death, yet we do not hesitate to bury our dead within that time." Yes, truly; but we do not bury them before they die, although we may be very certain that death is imminent.

Nor will a thoroughly unprejudiced writer be so incautious as to use a metaphor in a misleading way. Not that I object to figures of speech. Indeed, Professor Terman's reference to my paper as an "oratorical bombshell" is positively flattering. Figures of speech are legitimate and often invaluable in controversy as in other forms of discourse; but one ought not to sacrifice truth for the sake of a clever phrase. Professor Terman speaks

[1] I have this phrase from Professor B. H. Bode, who says in a personal letter anent this controversy: "The right of the individual to share in the spiritual life of the race is really the issue. This is *the* important item in any properly constructed program of education."

of my "rhapsodic peroration . . . . . on the ultimate illumination of the world by gleams of light struck from dull minds." The sentence is a rhetorical achievement—but it is quite the opposite of what I said. It is the light that is *let in* to common minds that will illuminate the world if anything does.

These are, perhaps, minor matters of disagreement. Not so to be characterized is the fundamental question at issue—namely, the possibility of developing through educative and other environmental agencies the traits that the determinists assume to be both native and essentially unmodifiable.

In my paper I accepted as an hypothesis the probable existence of certain biological traits underlying and conditioning mental growth. I assumed that the structures and functions constituting these biological traits were subject to the biological laws of variation and growth. In respect to their growth, I assumed that they matured fairly early in life. In so far as I can learn, the sum of these traits makes up the hypothetical entity that the determinists call "general intelligence." Whatever mental development may be due exclusively to the natural maturation of the structures and functions presumably underlying general intelligence I termed, for convenience, "vertical growth." With it I contrasted the mental development that comes from the acquisition and organization of experiences, whether gained directly from adjusting to actual situations or indirectly through a mastery of the social heritage. This variety of mental growth I characterized as "horizontal."

I make no claim of originality for drawing this contrast. It is obvious enough once the premises are assumed; hence I am not surprised by Professor Terman's announcement (p. 56) that Binet made the same distinction fifteen years ago; but when Professor Terman goes on to say that "it has been especially insisted upon by all psychologists in the field of individual differences" I am mildly curious to know why the many competent psychologists present at the Chicago meeting did not recognize their old friend and use it then and there to demonstrate that the "bombshell" was only a "dud" after all. Prompt action at that time

might have saved the expense to which one of the publishing houses specializing in test materials went in reprinting Professor Terman's editorial and sending it broadcast.

All this impels me to believe that the particular distinction that I had in mind has not been so clearly recognized as it might be—or, at least, that its implications have not been so thoroughly explored as the gravity of the issues at stake clearly demands. These implications seem to be tunnels into the very foundations to deterministic philosophy. Is it not indicative of its hectic haste to create out of hand a predictive science that this school of psychology has left the citadel of its central hypothesis so easily open to attack?

May I call attention to a few of the implications in question? Let us agree that what the determinists call "general intelligence" is either a single or multiple biological trait. If so, it is *a priori* improbable that its general level has been essentially changed during the course of human history, or, indeed, during the long prehistoric period that elapsed between the completed evolution of man's present structure and the invention of writing. There is, too, an abundance of empirical evidence to support this inference—for example, the superb cranial development that the Cro-Magnon race attained fully 20,000 years ago. If, as Professor Terman insists, "intellectual abilities are pretty largely determined by native endowment" (p. 60), it seems equally true that general intelligence took an unconscionably long time in getting into action, and the suspicion is aroused that present-day psychology is ascribing vastly more significance to nature and far less significance to nurture than the facts warrant.

This suspicion is strengthened by a mass of evidence so overwhelming in the aggregate that the suspicion rapidly grows into a conviction. If, for example, native intelligence were so superior a force as compared with culture, we should expect to find innumerable instances of discontinuity in social evolution; we should expect that superior intelligences widely separated in space and time would have "hit upon" the same improvements in the conditions of life. As a matter of fact, the evidence points

compellingly toward a continuity of culture even in prehistoric times.[2] It has clearly been the accumulation and consolidation of experiential gains that has lifted humankind from the paleolithic levels.

Again, if native intelligence were so all-important, the turning-points of social evolution would have been marked by positive variations or increases in native intelligence and these would necessarily have been widely spread among millions of individuals. This hypothesis not only involves us at once in a biological absurdity, but is clearly inconsistent with the facts. The great turning-points of social evolution have actually been marked by improved methods of disseminating experience—*of letting more light into common minds!* The invention of writing has been characterized quite without exaggeration as the greatest event in human history. It is no mere coincidence that the beginning of "modern" history was contemporaneous with the development of the printing-press in Europe. Nor is it at all accidental that the nations today that rank highest on the scale of civilization and progress are those in which a substantial form of elementary *popular* education is most nearly universal.

I am aware, of course, that efforts have been made to explain social evolution in terms of biological improvement. It is easy to say that certain countries are backward because their peoples are either biologically undeveloped or biologically decadent. Galton explained the Dark Ages on the assumption that the high I.Q.'s of both sexes sought a celibate refuge in the monasteries and convents, leaving the common man, the moron, and the imbecile to propagate the species. Mr. Madison Grant and others have attributed all human progress to the native abilities (not exclusively or even predominantly intellectual, by the way) of the blue-eyed Nordic peoples, and have voiced a solemn warning that, unless the Nordic stock keeps its own blood pure and the "inferior" brunette peoples in a proper degree of subjuga-

[2] Cf. a summary of the evidence, with citations to the monographic literature in the first supplementary volume of the *Encyclopaedia Britannica*, v. xxx, 1922, "Anthropology," especially pp. 147 ff.

tion, civilization will quickly and inevitably "go to pot." On the other hand, however, we have the now classic conclusions of Odin, Ward, and Cattell, emphasizing the outstanding significance of environmental factors; more recently Huntington[3] has made out a plausible case for the environmental influence of climate as a prime determinant of human achievement; developments in the field of tropical medicine seem to explain in the humbler but less fatalistic terms of the hookworm and the malaria-mosquito many defects that the determinist would ascribe to the inborn incapacity of the tropical peoples; while the possibilities of controlling some of the physiological conditions of mental development through endocrine treatment, if not as yet warranting extravagant hopes,[4] are at least sufficiently convincing to counteract the equally extravagant despair that determinism encourages.

The current teachings of educational determinism are dangerous because they proceed with a dogmatic disregard of the possibilities of insuring progress through environmental agencies. This disregard is so studied, so pointed, as to brand the determinist as thoroughly prejudiced. Take, for example, the current deterministic interpretations of the results of the Army tests — interpretations which leave entirely out of account any possible influence of environmental factors. The fact that the median mental age of the enlisted men coincided almost exactly with the median age of leaving school is completely ignored. The higher mentality of those who remained in school is dogmatically explained as due to selection with no whit of credit given to the school.[5] Even the clear possibility that practice-effect might transfer from recent school experiences in taking examinations

[3] In his *Civilization and Climate* (1915) and other works.

[4] See the admirable symposium on the endocrines in the *Journal of the American Medical Association*, 79:89-109, July 8, 1922.

[5] Professor Terman's own arguments against accepting the results of the Army tests as indicative of average adult mental age contain no suggestion that the differences found may have been due to educational inequalities. The educational factor is mentioned but in a context that shows clearly that Professor Terman is thinking of the high school and college as selective agencies. (See Terman, L. M. "Mental growth and I.Q." *Journal of Educational Psychology*, 12:330-331, September, 1921.)

to the similar test situation is never mentioned, although every experiment on "transfer" has taught us that practice-effect is a factor that must be reckoned with. Personally I am astounded that competent psychologists and trained students of science should be guilty of such loose reasoning. Long overdue is the work that was reported only recently by Mr. Herbert B. Alexander[6], who correlated Army Alpha scores taken by states with the rank-order of the states in respect to educational facilities and other environmental advantages. How the determinists are going to square themselves with the public in the face of these correlations puzzles me; I think that it will puzzle them a bit, for Mr. Alexander's conclusion is that, "in so far as it applies to such large social groups as the American states, Army Alpha appears as a test of what *has* been learned rather than what *can* be learned."

Why is it that a conclusion so obvious to anyone acquainted both with the theory of the tests and with the wide variations in American educational systems was not considered as at least a possibility before the fatalistic and fantastic interpretations were sent broadcast? Rightly interpreted, the results of the Army tests constitute a fairly clear vindication of the contentions of the environmentalists. How does it happen that quite the opposite implications have gone forth, if not with the sanction of, certainly without a disclaimer from, the responsible group? At the present juncture in social evolution it should be no light matter under the guise of science to promulgate an obviously one-sided and now apparently fallacious theory the net effect of which is to weaken public faith in universal education.

Clearly if the possibilities of insuring progress through environmental agencies had only an equivalence of plausibility as compared with Galtonian fatalism, every consideration of humanity would compel us to accept them as working hypotheses in education. As a matter of fact, the plausibility is not equivalent, it is distinctly preponderant. Professor Terman suggests

[6] Alexander, H. B. "A comparison of the ranks of American states in Army Alpha and in social economic status," *School and Society*, 16:388, September 30, 1922.

that Galtonian fatalism "is entitled to the right of way as a guide to action until something more substantial than sentiment can be brought to bear against it." Whether the facts and reasoned inferences that I have adduced are more than "sentiment," the reader will be able to judge. Should he consider them sufficient only to afford a fairly even balance with the opposing facts and inferences, then I contend that sentiment should be frankly permitted to cast the deciding vote. Sentiment has not been an entirely negative force in this world of ours. It has accomplished some rather important things right in the face of the theory that Professor Terman is supporting. What, may I ask, would have been the effect of the anti-slavery agitation if the hypothesis of an unmodifiable "general intelligence" had been current at that time? What would be the case of the universal franchise? Indeed, why not hereditary leadership and even the divine right of kings if only these doctrines could be tempered with a little Mendelism? We are wont to grumble about the slowness with which science develops. Personally I am devoutly grateful that "sentiment" had an opportunity to work a few miracles before modern psychology "discovered" these innate, radical, and unchangeable differences in native mentality.

But to get back to the distinction between vertical and horizontal growth, which holds, I believe, the key to this apparent antinomy between nature and nurture. Granting a biological basis for mentality, and granting that this basis is subject to the biological laws of variation and growth, it is my contention (1) that the innate variations diminish rapidly *in social significance* as we go up the scale from the idiot toward the genius, because (2) horizontal growth (stimulated by environmental forces) compensates in many important ways for the differences in vertical growth (due to native factors). The relatively "low visibility" of the differences between the common man and the genius as compared with the differences between the idiot and the common man, has not been mentioned by any of the determinists who have been so kind as to discuss my paper. It is, I think, a crucial issue.

Professor Terman barely approaches this issue when he denies (p. 59) that there is any "improvement in the ability to perform more and more difficult types of intellectual operation" or in the "ability to deal with the abstract" between the ages of 21 and 31, and cites the results of the Army tests in support of this sweeping statement. Professor Terman, I am then safe in assuming, holds that ability to deal with the abstract increases up to the limits of vertical (biological) growth, and then suddenly stops. His evidence for this is drawn from group tests of a relatively simple character given only once to men between the ages in question. He implies that there was no correlation between age and intelligence as thus measured.

Professor Terman hopes that, if I believe this "negative result," to be due to the "use of a faulty instrument," I shall "devise another capable of yielding more valid data." I wish that I had both the time and the intelligence thus to help my good friends, the determinists, out of what seems to be a pretty bad hole. Somebody ought to do it.

Does it not seem strange, however, that Professor Terman lays so much stress on the results of the Army tests when they seem to uphold his preconceptions as to the absence of mental growth between 21 and 31, and yet vigorously discredits them when they go counter to his contention regarding the average mental age of adults?[7] In the latter controversy (as to whether mental maturity comes in the average of cases at 13.4 years or 14.5 years or 16 years), I am just now interested only as it typifies the fog in which the whole theory of the I.Q. is enveloped. Professor Terman's assertion that the Army tests do not show any evidence of intellectual growth between the ages of 21 and 31, however, is worthy of further attention. Reference to the bulky report of the Army tests discloses the fact[8] that no correlations were worked out between the scores made by the enlisted

[7] Terman, L. M. "Mental growth and the I.Q." *Journal of Educational Psychology*, 12:325, 401, September, October, 1921. (Especially pages 330-331.)

[8] Yerkes, Robert. (editor) *Psychological examining in the United States Army.* (Memoirs of National Academy of Science, Vol. 15) Washington, D. C.: Government Printing Office, 1921. p. 813.

men and their chronological ages. In the case of the officers, the tabulations of scores according to age show a steady decline in "intelligence" between the ages of 20 and 60. According to the graph (Memoirs XV, page 814) the officers under 21 are the most intelligent of all. The officers between 51 and 60 show a deterioration of about twenty percent from the 20-year level.

The deterministic explanations of this apparently progressive deterioration of intelligence with age illustrate admirably the inevitable tendency of deterministic thinking. The obvious explanation (which the determinist studiously avoids) is that the Alpha tests are tests of education, and that, in consequence, the younger officers, being closer to their school days, do far better in the tests than do the older officers. It is possible, too, that the improved schooling of the past two decades has helped the younger officers. Even to suggest this, however, would be impossible to the dyed-in-the-wool determinist. All differences *must* be due to "selection" if the hereditarian hypothesis is to be upheld—consequently all other possibilities are rigorously excluded!

It is conceivable that the Army tests might have given us some valuable information concerning the possible growth in intelligence (or whatever it is that the Alpha tests measure) between the ages of 21 and 31. If the test scores of enlisted men coming from the clerical occupations which give constant practice in many of the Alpha materials were tabulated according to age, it is possible that a positive correlation might be found. Indeed, this is fairly predictable since the Alpha scores always "correlate" highly with length of schooling—a fact that the determinist again attributes not to an assumption that Alpha may measure education, but to the overworked hypothesis that education always and inevitably selects the bright minds.

Let us drop the Army tests, however, and return to Professor Terman's clear implication that even the most specific training in abstract thinking will not improve "one's ability to perform more and more difficult types of intellectual problems" or one's

ability to "deal with the abstract," once biological maturity has been reached. Lincoln at twenty-one, it would seem, had as much ability to grasp tremendously complicated and difficult problems as he had at fifty-two! Darwin on the Beagle at twenty-two had the same capacity for dealing with abstract biological questions that he possessed twenty-eight years later when he published the *Origin of Species!* All the intervening years of struggle, of study, of experience with men, added nothing to Lincoln's ability; all the intervening years of observation, experiment, and close thinking did not increase Darwin's acumen by so much as an iota!

"Nonsense," the determinist will protest, "that is not what I mean. I only mean——." But I shall let him tell us what he means—if he can. I shall only say that both Darwin and Lincoln could do a type of thinking at fifty that they could not do at twenty-one—or at thirty-one, for that matter. I contend that the growth in the intervening years was real intellectual growth, and if it be objected that it was not growth in "general intelligence" I answer that it then represented something vastly more important than general intelligence.

I furthermore contend that intellectual growth of this horizontal type is possible among individuals of very moderate I.Q.'s. My contention is not merely an "emphatic assertion," as Professor Terman would have us believe. It is sanctioned not only by common-sense and everyday experience but by practically every recorded experiment in learning. That specific abilities are greatly increased by training I thought everyone conceded; the only question has seemed to be how far the improvement "transfers" to other situations. Even this is still an open question; but Professor Terman's sweeping statement is a clear denial of the potency of *specific* discipline itself, once the limits of vertical growth have been reached.

Professor Terman wonders whether my "apparent faith in pronouncements based upon inner vision" would let me give "much weight to any kind of objective evidence the experimentalist might be able to bring forward." I make no pretense of

being a man of science; I confess, indeed, to abounding faith in certain "pronouncements based upon inner vision," and I have small faith in what the scientist calls the "naked fact," preferring those that are decently clothed with meaning. However, if my scientific training failed to make me a scientist, it left, I think, as a faint deposit, a moderate ability to distinguish fairly clearly between a fact and an artifact, between a fact and an assumption, and between a law and an hypothesis. Some frank untangling of their "evidence" on the basis of these distinctions, I venture to say, might well have been for the determinists a preliminary to the rather presumptuous assumption that, in the field of education, they and they alone are doing truly "scientific" work.

And speaking of facts and meanings leads me to another disagreement with Professor Terman. He does not like my "naïve" definition of democracy as the collective supremacy of the common man. Nor do some other people. I did not formulate this definition as an ideal, but as a fact—and a most tremendous fact fraught with a most tremendous meaning. Professor Terman implies that the collective supremacy of the common man is inconsistent with the facts of biology and psychology. If so, a big fact is in conflict with some little facts. As I have suggested, practically every great forward movement in social evolution has been made in the very face of the theory for which Professor Terman stands. Each of these movements has tended toward the liberation of the great masses and the assumption by them of larger and larger measures of power. After studying this development with apparent justice from every point of view, Lord Bryce concluded that democracy, even in this "naïve" sense, had abundantly justified itself. The big fact seems to have swallowed and digested the little facts, and theories based on the latter and utterly disregarding the former would consequently seem to have now only an academic interest. Professor Terman wishes to formulate a definition of democracy that will "square with the demonstrable facts of biological and psychological science." (p. 62.) I admire this ambition of the determinists to set an example of

clear thinking. Is it unkind to suggest that their own field fairly bristles with opportunities for practice? Democracy, as the collective rule of the common man, seems likely to get on fairly well for a while on the present definition; but a good, sound, clear definition of "general intelligence" that will "square" with common-sense, everyday experience, and the facts of history would be a "winner."

Such a definition, if happily achieved, might do something to clarify the determinist's conception of "leadership" and the alleged responsibility of the school to select potential leaders and equip them for social service. Professor Terman says that I would consider it "most undemocratic to remind a class of college graduates that they are marked by ability and training for leadership." (p. 61.) Quite so; I would rather tell them that they owe to society a debt of *service* in return for the privileges and advantages that they have enjoyed. Leadership in any sense of the term they may or may not achieve, but positive service of some sort they can all render. It seems indeed to be the verdict of human experience that the less they have their eyes on the "distinctions" and "prominence" that the term "leadership" so inevitably implies, the greater will be their chance of becoming effective leaders in a democratic society. Nothing seems to be more inimical to such leadership than an over-weening consciousness of one's superiority to the common run of humanity. This negative and "inferior" trait, it seems, more than counterbalances the traits, however numerous, that are positive and constructive. Certainly a striking characteristic of the very leaders whom Professor Terman names is their humility—their sincere humility, not a posed substitute. In my judgment, neither social progress nor individual happiness will be augmented by encouraging young people to believe that they were born to lead. With individuals as with nations, the superiority-complex seems to be heavily charged with dynamite.

If it is desirable that there should be more high I.Q.'s among our effective leaders, the best way to get them, I contend, is to educate the rank and file justly to evaluate and select them rather

than to imbue these gifted children with the notion that they were Heaven-sent to lead their dull fellows. Professor Terman accuses me of confusing "leadership" with "drivership." Well, whether the common man follows blindly or is blindly driven seems to me quite inconsequential. It is the tacit and nonchalant assumption of necessary and irremediable blindness that I am calling into question. It is my contention that the common mind of humanity has already demonstrated its ability to think for itself; that universal education can train it to think more clearly and in larger units—in any case, that universal education can give it a common stock of dependable ideas with which to do its collective thinking—and that the first and foremost task of education is to do this job passing well.

I should be remiss if I were to close this rejoinder without again stating my conviction that mental tests have made very important contributions to educational progress. It would be the height of folly for education not to avail itself of these instruments in detecting individual differences in learning capacity whether such differences be innate or acquired. My quarrel is not with the tests, but with the fatalistic assumptions which are part of their "heredity." They derive from Galton, and they are over-burdened with Galtonian tradition. The present-day determinists repudiate some of Galton's teachings. One in particular is to them anathema, although it seems to me far worthier of survival than others that they retain. I refer to Galton's theory that genius is eminently well qualified to look after itself—that it is bound to come into its kingdom in spite of almost every obstacle short of premature death. I have a suspicion that Galton came pretty close to the truth here. On the other hand, there is the great rank and file of common or average intelligence. To endow the masses with genius is biologically impossible; but to endow the masses with the fruits of genius is both educationally possible and socially most profitable. The mental tests will help most if they aid the teacher in discharging this transcendent duty. They will render a gratuitous and disastrous disservice if they encourage in the teacher the conviction that the illumination of

common minds is either an impossible or a relatively unimportant task.

This is the "man of straw" against which (or whom?) Professor Terman accuses me of waging a "spectacular fight." (p. 60.) Perhaps the straw stuffing got damp and fermented—in any case, I notice that it has developed a very lively "kick." And is it not passing strange that three important programs at the Chicago meeting should have been devoted to a series of attacks upon a straw man, and that these attacks were directed chiefly by specialists in the field of mental measurements? It should be "read into the record" that at least two of these programs were either instigated or deliberately planned by the psychologists to offset what they themselves believed to be dangerous tendencies in the use of the tests and the interpretations of the results. My own criticisms of the movement were mild as compared with the appalling fallacies and inconsistencies pointed out by recognized authorities in the field itself, and especially by Messrs. Colvin, Rugg, and Trabue. As an "outsider," I have been made the "goat"—but to be even a goat in a good cause is better than to be a sheep blindly following the bell-wether in a bad cause that happens at the moment to be the fashion.

PROGNOSIS TESTS OF ABILITY TO LEARN FOREIGN LANGUAGES

THOMAS H. BRIGGS
Teachers College, Columbia University

Among school administrators there is a widespread opinion that too large a proportion of secondary-school pupils are permitted to elect a foreign language. Certainly the numbers who drop the subject without continuing it long enough to achieve any permanent power manifest one element of waste that should so far as possible be lessened. The increase of junior high schools with their earlier offerings of foreign languages serves to exaggerate the seriousness of the situation. The two chief possibilities of economy are (1) the modification of foreign language courses so that they may be of value to the extent to which pursued and (2) the restriction of election in this field to those who are known to have the ability to profit by it.

In 1918 Professor Truman Lee Kelley and I attempted to ascertain the extent to which a prognosis could be made by tests of the ability to learn foreign languages. For good reasons it was not possible to prosecute the study far enough to make the results of great value for practical use, but it is thought that the method used and the tentative conclusions reached warrant publication at this time. It is hoped to continue the study later in application to each of the foreign languages offered generally in our secondary schools.

The first step was the analysis of learning a foreign language into the major mental activities involved. A pupil who studies any foreign language in our schools is required (1) to memorize a vocabulary, (2) to memorize paradigms, and (3) to translate. Other activities are also required, but these three were selected as being the most important in the eyes of the teachers, who judge of failure or success.

The second step was to find or to devise tests that seemed likely to measure the abilities involved in the major phases of

the work. The tests selected, with a brief justification of their choice, are as follows:

1. *Free association.* The pupils were required to write in columns as many different words as they could in three minutes. The total score was the number of words written. This test was used chiefly on the assumption that the same mental powers that had operated in the acquisition and recall of English words would function in learning and using the vocabulary of a foreign language.

2. *Extent of vocabulary.* The pupils were required to mark after each of 100 words, which had been selected at regular intervals from a standard dictionary, a "1" if they knew the meaning. At the conclusion of these responses the pupils were asked to write a definition of each of twenty designated words that they had marked "1." The percent of correct definitions was used as a correction index for the total score on the original 100 words. This test was used on the same assumption as that underlying the free association test.

3. *Memory of nonsense syllables.* An original test devised by Professor Kelley. It was used on the assumption that at least in the beginning of the study of a foreign language the acquisition of vocabulary and paradigms is similar to the rote memory of nonsense syllables.

4. *Briggs Analogies.* This test required the pupils to write a fourth word which bears the same relation to a third that the second does to the first. All the relations are of the forms of nouns, pronouns, and verbs, e.g.,

boy	boys	woman	.....
cow	cow's	she	.....
give	given	sit	.....

This test was used chiefly on the assumption that the same mental powers involved in learning the forms of English words would be used in learning the forms of foreign words. Moreover, used in other experiments, the test had manifested a high reliability and close correlation with measures of general intelligence.

5. *Kelley-Trabue Completion Test.* This well-known test was used chiefly on the assumption that it measures powers that are involved in translation, that to insert "wet" in "The boy in the rain got ....." is similar to supplying the meaning in a foreign language sentence, the meaning of which is partly known, to selecting among several possible meanings; or to deciding whether *horti* is a genitive singular or a nominative plural. Moreover, the test has a high reliability and has correlated well with measures of intelligence.

6. *Kelley Substitution.* This test, devised especially for the study, requires the substitution of certain symbols for stimulus numbers. The faster and more accurately the key at the top of the page is learned, the higher the possible score. This activity was thought to be similar to translating, especially from English into a foreign language.

7. *Kelley Opposites.* An opposites test was used because of the fact that it is wholly linguistic and that in another study it had given a good positive correlation with pupils' general success in school work. For this study Kelley devised a new test of forty paired words, graded in difficulty, the pupils being required to indicate whether the meanings were the same or the opposite.

This battery of seven tests was administered to a number of entering pupils who elected a foreign language in seven high schools in Parkersburg, West Virginia; Topeka, Kansas; New Brunswick, New Jersey; Meriden, Connecticut; Mankato, Minnesota; Cleveland, Ohio; and New York City. The tests were given and scored by the teachers.

The only criterion of success used was the term marks in foreign language. These marks are so unreliable that the resulting coefficients of correlation can be considered only as "promising" and indicative of the probable fact that the method would produce much better results with a more stable criterion. To attempt to correlate with teachers' marks is like an attempt of a blind man to walk sociably with a drunkard over very uneven

ground without physical contact. Kelley has reported[1] that the correlation between the marks of two teachers for the same pupils in the same subjects ranges from 0.28 to 0.38, and he computed that the highest correlation that might be expected from prognosis tests with teachers' marks would be the square root of the reliability of the latter. In so far as his earlier estimate of the reliability of teachers' marks is true for the teachers who cooperated in this study, the theoretical limit of the possible correlation between the prognosis tests and foreign language marks is 0.53 to 0.62.

There was no means of knowing whether the cooperating teachers were more or less skilled and accurate than the average in estimating pupils' success. We do know that the results of the several tests correlate very differently with the marks assigned by the individual teachers. The scores of the analogies test, for example, correlated 0.025, 0.307, and 0.454, and of the completion test 0.142, 0.379, and 0.796 with the term marks assigned by three teachers in the same school.

By means of a regression equation, Kelley selected a battery of three tests which when weighted as follows gave the best results:

Briggs Analogies (4)
Kelley-Trabue Completion (2)
Free Association (1)

The correlation of the scores on these three tests with the marks of all teachers for the 598 pupils in the six high schools outside New York City who remained until the end of the semester was 0.47. As evidence that the tests were measuring special ability to learn foreign languages, the weighted scores of the battery were correlated with pupils' marks in English. The correlation was 0.31—distinctly lower.

Considering the theoretical limits previously stated, a correlation of 0.47 is quite as high as one could hope to get; but is far too low to use alone as an administrative device for exclud-

[1]Kelley, T. L. *Educational guidance.* (Teachers College Contributions to Education No. 71) New York: Teachers College, Columbia University, 1914. p. 15.

ing those who have small probability of succeeding in the study of foreign languages. The battery might be used profitably and practically, however, in connection with other measures of pupils' probable expectation of remaining in school, etc. Table I shows that of the pupils having the highest quarter of the battery scores, 71.1 percent received marks of 80 or better; while only 18.1 percent of those in the lowest quarter received similar high marks. One-third of those in the lowest quarter failed, as compared with only 3.4 percent of those in the highest. Of the 299 pupils who were in the upper half of the prognosis test scores, only 12 failed; but of the 150 in the lowest quarter two-thirds passed in the first term's work.

TABLE I. PERCENTS OF THE PUPILS IN EACH QUARTER OF THE PROGNOSIS TEST SCORES WHO RECEIVED THE INDICATED SCHOOL MARKS IN FOREIGN LANGUAGES

(598 *Pupils in Six High Schools*)

School Marks	Prognosis Test Scores			
	First quarter (lowest)	Second quarter	Third quarter	Fourth quarter (highest)
Failed (0–69)	33.6	20.8	4.8	3.4
Passing (70–79)	48.3	44.1	41.8	25.5
Superior (80–100)	18.1	35.1	53.4	71.1
	100.0	100.0	100.0	100.0
Highly Superior (90–100)	3.4	5.2	11.6	30.2

Table II shows the percents of the failing, passing, and superior pupils who fell into each of the four quarters of the prognosis test scores. With the exception of the scores in the third quarter, they fall into regular straight line curves.

The results with the 304 pupils in the High School of Commerce of New York City were not so satisfactory, though they show that the battery of tests does to some extent measure the

TABLE II. PERCENTS OF THE PUPILS IN EACH SCHOLARSHIP GROUP WHO FELL INTO THE SEVERAL QUARTERS OF THE PROGNOSIS TEST SCORES

(598 *Pupils in Six High Schools*)

Prognosis Test Scores	School Marks			
	0–69	70–79	80–100	90–100
Lowest quarter	53.2	30.3	10.2	6.7
Second quarter	34.0	26.6	20.4	10.7
Third quarter	7.4	27.0	29.4	22.7
Highest quarter	5.3	16.1	40.0	60.0
	99.9	100.0	100.0	100.1

ability of ninth-grade pupils to learn a foreign language. Unfortunately the detailed data have been lost so that the coefficient of correlation cannot be given; but the collected grouping of the pupils by quartiles is shown in Table III. The passing mark in this school is 60, instead of 70, as in the others. Why the results were less satisfactory in this school than in the other six one may not with any certainty say. There are factors, however,

TABLE III. PERCENTS OF THE PUPILS IN EACH QUARTER OF THE PROGNOSIS TEST SCORES WHO RECEIVED THE INDICATED SCHOOL MARKS IN FOREIGN LANGUAGES

(304 *Pupils in High School of Commerce, New York City*)

School Marks	Prognosis Test Scores			
	First quarter (lowest)	Second quarter	Third quarter	Fourth quarter (highest)
Failed (0–59)	23.6	30.3	29.8	10.1
Passing (60–79)	58.3	47.4	44.8	36.2
Superior (80–100)	18.1	22.4	25.2	53.7
	100.0	100.1	99.8	100.0
Highly Superior (90–100)	2.8	6.6	8.0	24.7

which make it probable that the battery should have been no less effective in prophesying the ability of these metropolitan pupils to acquire the rudiments of foreign languages.

Certain good reasons made it impracticable to apply the battery of three tests to other pupils or to refine and supplement the method used. It is desirable (1) to divide the selected tests into equal halves, each administered at a different time, so as to obtain an estimate of the effect of accidental factors; (2) to consider the scores and the class marks of pupils who, for one reason or another, are eliminated before the end of the semester; (3) to make further correlations of the test scores with marks at the end of the second semester and between the marks of the first semester and those of the second; (4) to gather information concerning all the pupils as to absence, illness, outside work, any foreign language spoken or heard at home, effort, etc., with "case studies" of those whose marks are at variance with their test scores; and (5) to prepare a set of criterion tests more reliable than teachers' marks and more indicative of the knowledge acquired in foreign languages. Most of these improvements have been used by one of my students, Dr. William Sims Allen, in a study soon to be published on the prognosis of ability in first-year Latin.

COMPARATIVE VALIDITY OF THE HOTZ SCALES AND THE RUGG-CLARK TESTS IN ALGEBRA

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In his introduction of "A Critical Study of the Harvard-Newton Composition Scales," Isidore Kayfetz says: "In this country many professors, students, superintendents, principals, and teachers are at present engaged in writing books, monographs or articles on standard tests and scales. All who are so engaged may be roughly divided into three classes: (1) those who devise scales, (2) those who praise them, (3) those who condemn them. There is a crying need for a fourth class, namely, those who will study them historically, critically, comparatively, and experimentally in the light of experimental-pedagogical criteria and methods. Perhaps the future will give rise to this class." As members of this fourth class, the writers undertook this investigation.

Three of the First Year Algebra Scales, Series A, of H. G. Hotz and seven of the Standardized Tests in First-Year Algebra of H. O. Rugg and J. R. Clark were selected for study. The Hotz scales are development tests. The Rugg-Clark tests, with the exception of the Verbal Problems, are rate tests.

The purposes of the study were: (1) to investigate the validity of both series of tests; (2) to compare the two series in regard to economy of time; (3) to study the difficulties in taking, giving, and scoring; and (4) to determine the value of the tests in diagnosis.

The investigation was made possible by the helpful cooperation of the principals, teachers, and pupils in the following Illinois high schools: Cicero, Elgin, Joliet, Kenilworth-New Trier Township, Maywood-Proviso Township, Whiting; and (at Chicago) the Harrison Technical, Hyde Park, Lane Techni-

cal, Parker, Wendell Phillips, and the University High School of the University of Chicago.

Method and Material

The Hotz Problem Scale and the Rugg-Clark problem test, called Verbal List A, were given in ten classes. These classes, I-X, completed first-year algebra at the end of the first half-year. The tests were given the latter part of the following March and the first half of April. The time allowed for each test was 25 minutes. Acceptable papers were received in each test from 240 pupils.

In twenty-five classes were given the Hotz Equation and Formula Scale and the following seven of the Rugg-Clark Formal Tests: Preliminary Tests, A and B, and Tests 4 (Simple Equations), 10 (Fractional Equations), 11 (Formulae), 12 (Quadratic Equations), 13 (Simultaneous Equations). Eleven of these classes, XI-XXI, completed first-year algebra at the end of the first half-year. In these classes the compared tests were given the latter part of March and the first half of April. Acceptable papers were received in each test from 264 pupils. The same tests were also given in May of the same year in fourteen classes, XXII-XXXV, in which first-year algebra was completed at the end of the school year. Acceptable papers were received in each test from 267 pupils in these fourteen classes. Thus for the equation and formula tests, given in the twenty-five classes, XI-XXXV, 531 acceptable papers were obtained in both the Hotz and Rugg-Clark tests.

The Hotz Graph Scale and the Rugg-Clark Graph Test were given in eleven classes, XXXVI-XLVI. These classes completed first-year algebra at the end of the first half-year. The tests were given the last two weeks in March and the first part of April. Acceptable papers were received in each test from 283 pupils.

The tests of the different authors were administered in every class on the same day or on successive days. In twenty-three classes the Hotz test was given first; and in twenty-three classes the Rugg-Clark test was given first. Usable papers from tests

by different authors were thus obtained from each of the same 1054 pupils.

Copies of the Rugg-Clark problem test, Verbal List A, were specially prepared for use in the investigation. Mr. Clark kindly gave instructions as to spacing and page arrangement. Copies of all the other tests were used in published form. In the administration and scoring of tests, the directions provided by the authors were followed carefully. All the tests were administered and scored by Miss Harris.

Problem Tests

Order of difficulty of the problems.—Tables I and II and the accompanying Figure 1 indicate the order of difficulty of the

TABLE I. HOTZ PROBLEM SCALE. PERCENT OF PUPILS SOLVING EACH PROBLEM

Problem Number	Hotz given first (Classes I-V)	Rugg-Clark given first (Classes VI-X)	Total (Classes I-X)
1	84.5	98.4	91.7
2	75.9	90.3	83.3
4	74.1	84.7	79.6
5	56.9	68.5	62.9
7	25.0	36.3	30.8
8	19.8	24.2	22.1
9	8.6	12.1	10.4
12	1.7	3.2	2.5
13	0.9	1.6	1.3
14	0.9	3.2	2.1

TABLE II. RUGG-CLARK PROBLEM TEST. PERCENT OF PUPILS SOLVING EACH PROBLEM

Problem Number	Hotz given first (Classes I-V)	Rugg-Clark given first (Classes VI-X)	Total (Classes I-X)
1	79.3	79.0	79.2
2	71.6	79.0	75.4
3	70.7	66.1	68.3
4	53.4	70.2	62.9
5	38.8	50.4	44.6
6	35.3	43.5	39.6
7	25.0	18.5	21.7
8	31.1	23.4	27.5
9	5.2	5.6	5.4
10	11.9	23.0	17.7
11	14.5	31.1	23.1
12	0.0	0.8	0.4
13	1.7	2.0	1.9

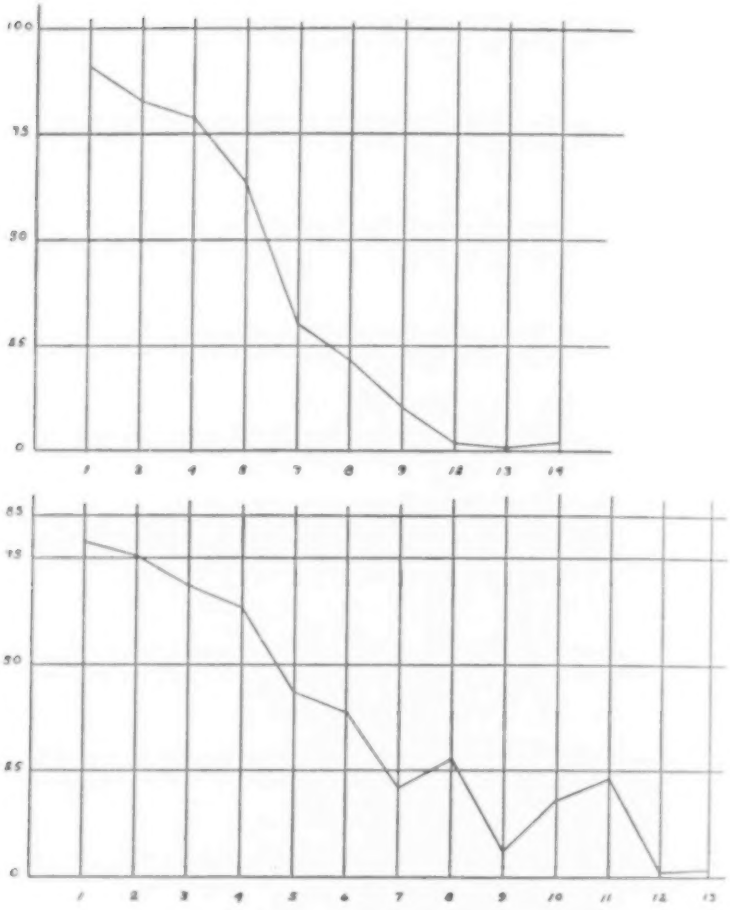

FIGURE 1. PERCENT OF PUPILS SOLVING EACH PROBLEM IN THE PROBLEM TESTS. UPPER CURVE FOR THE HOTZ TEST; LOWER CURVE FOR THE RUGG-CLARK TEST. DATA FROM TABLES I AND II

problems in the Hotz Problem Scale and the Rugg-Clark Verbal List A for the 240 pupils taking these tests. They show a wider range in the percents of pupils solving each problem of the Hotz test than for the Rugg-Clark test. The range for the Hotz test is 90.4 and for the Rugg-Clark test 78.8.

In the Hotz Scale the order of arrangement was found to be one of increasing difficulty, except that problem 14 was somewhat easier than problem 13. From problem 8 to problem 13 there was much irregularity of arrangement in the Rugg-Clark test.

For ten classes and two methods of scoring the average coefficient of correlation between the two problem tests was 0.61.

Distribution of achievement of pupils.—Tables III and IV and the accompanying Figure 2 show the distribution of achievement of the 240 pupils in the solution of problem in the Hotz Problem Scale and the Rugg-Clark Verbal List A.

Table III shows that 2.6 percent of the pupils in classes I-V failed to solve a single problem in this test. Every pupil in classes VI-X solved one or more problems. Table III also gives the total number of problems solved, the number of pupils, the arithmetic mean, the median score, and the author's tentative median standards of achievement.

The method of scoring the papers in each test must be kept in mind in comparing the distribution of pupils around the median in number of problems right as shown in Tables III and IV

TABLE III. HOTZ PROBLEM SCALE. PERCENTAGE DISTRIBUTION OF PUPILS ACCORDING TO THE NUMBER OF PROBLEMS SOLVED

Number of Problems Solved Correctly	Hotz given first (Classes I-V)	Rugg-Clark given first (Classes VI-X)	Total (Classes I-X)
0	2.6	0.0	1.3
1	5.1	1.6	3.3
2	23.3	7.3	15.0
3	24.1	21.0	22.5
4	17.2	29.8	23.8
5	16.4	25.8	21.3
6	7.8	8.9	8.3
7	2.6	4.0	3.3
8	0.0	0.8	0.4
9	0.0	0.8	0.4
10	0.9	0.0	0.4
Number of "Rights"...	404.	524.	928.
Number of Pupils.....	116.	124.	240.
Arithmetic Mean.....	3.48	4.23	3.87
Median.....	3.8	4.7	4.3
	3-Months	6-Months	9-Months
Tentative Median Standards.....	4.3	4.9	5.6

TABLE IV. RUGG-CLARK PROBLEM TEST. PERCENTAGE DISTRIBUTION OF PUPILS ACCORDING TO THE NUMBER OF PROBLEMS SOLVED

Number of Problems Solved Correctly	Hotz given first (Classes I-V)	Rugg-Clark given first (Classes VI-X)	Total (Classes I-X)
0	2.6	1.6	2.1
0.5	0.8	0.0	0.4
1	4.3	7.3	5.8
1.5	2.6	0.8	1.7
2	16.4	8.1	12.1
3	15.5	11.3	13.3
3.5	0.0	1.6	0.8
4	11.2	14.5	12.9
4.5	0.9	3.2	2.1
5	16.4	10.5	13.3
5.5	0.9	0.0	0.4
6	5.1	10.5	7.9
6.5	2.6	5.6	4.2
7	6.0	7.3	6.7
7.5	1.7	2.4	2.1
8	6.9	8.9	7.9
9	2.6	1.6	2.1
9.5	0.9	0.8	0.8
10	1.7	2.4	2.1
11	0.9	1.6	1.3
Number of "Rights"...	510.	611.	1121.
Number of Pupils.....	116.	124.	240.
Arithmetic Mean.....	4.40	4.92	4.67
Approximate Median...	4.	5.	4.5
Computed Median.....	4.3	5.1	4.7

and Figure 2. In all the Rugg-Clark tests, if two answers were required in a problem and one answer was correct, one-half credit was given. This was done upon the advice of both authors, who were consulted personally. The unit on the horizontal axis of the Rugg-Clark curve is one-half problem or 0.5. In accordance with the author's directions, no partial credits were given in any of the Hotz Scales. The unit on the horizontal axis of the Hotz curve, Figure 2, is one problem or 1.

Figure 2 shows that the distribution of achievement for the Hotz Problem Scale was quite normal, while that for the Rugg-Clark test was quite irregular.

Equation and Formula Tests

Since the design of the Hotz Equation and Formula Scale and that of the Rugg-Clark Formal Tests were wholly different, the results will be taken up separately.

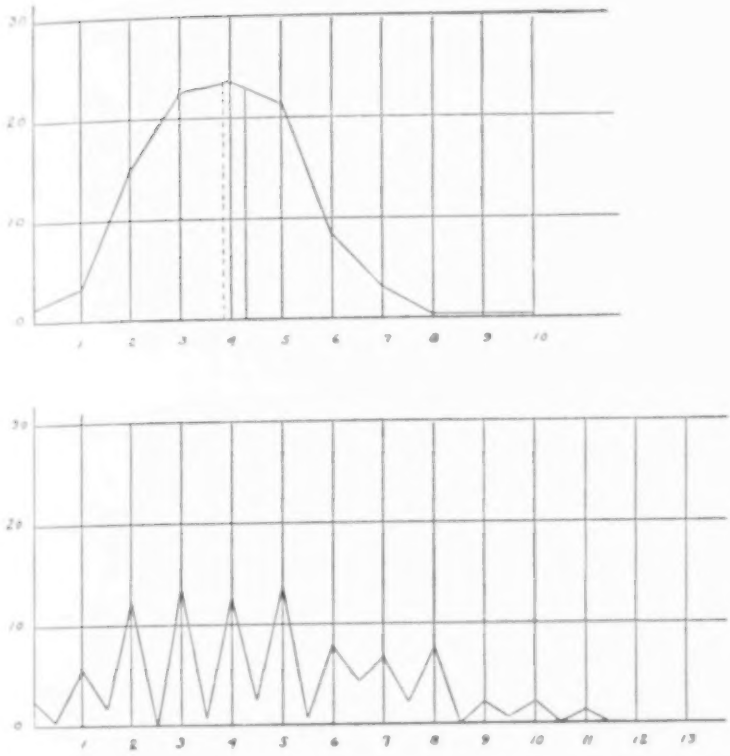

FIGURE 2. DISTRIBUTION OF PUPILS ACCORDING TO THE NUMBER OF PROBLEMS SOLVED CORRECTLY ON THE PROBLEM TESTS. UPPER CURVE FOR THE HOTZ TEST; LOWER CURVE FOR THE RUGG-CLARK TEST. DATA FROM TABLES III AND IV

Order of difficulty of problems in the Hotz Equation and Formula Scale.—Table V and Figure 3 indicate the order of difficulty of the problems in the Hotz scale for the 531 pupils taking this test. It will be recalled that the first group (classes XI-XXI) was tested some weeks after the work in first-year algebra had been completed and the second group (classes XXII-XXXV) a few weeks before the completion of it. It is very interesting to note the remarkable similarity of the curves representing the two groups. With the exception of problem 8, the

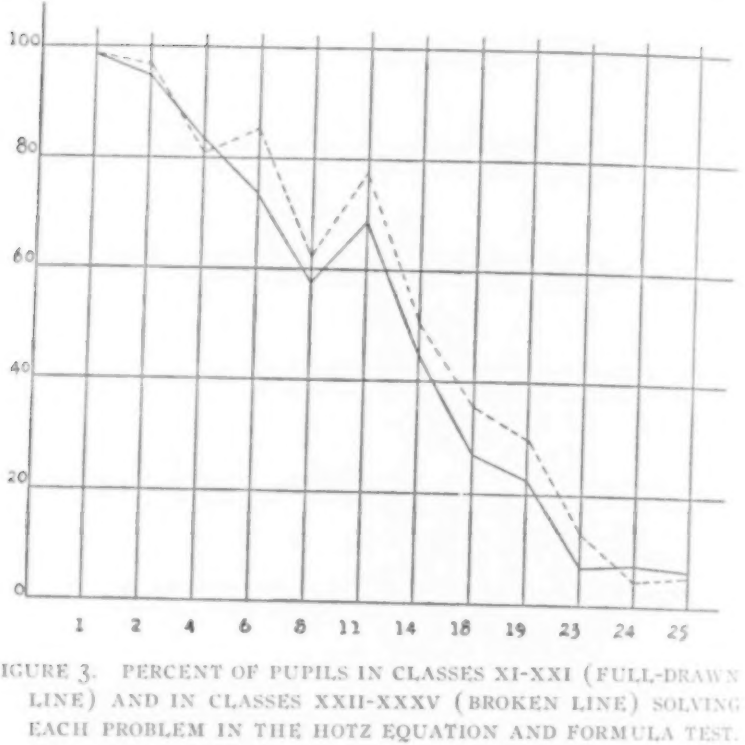

FIGURE 3. PERCENT OF PUPILS IN CLASSES XI-XXI (FULL-DRAWN LINE) AND IN CLASSES XXII-XXXV (BROKEN LINE) SOLVING EACH PROBLEM IN THE HOTZ EQUATION AND FORMULA TEST. DATA FROM TABLE V

TABLE V. HOTZ EQUATION AND FORMULA SCALE. PERCENT OF PUPILS SOLVING EACH PROBLEM

Problem Number	Classes XI-XXI	Classes XXII-XXXV
1	98.5	98.5
2	95.1	96.6
4	83.7	80.2
6	73.9	85.8
8	57.6	62.2
11	68.2	77.5
14	44.3	50.2
18	27.7	35.5
19	22.6	30.0
23	6.8	13.9
24	7.2	4.1
25	6.1	5.6

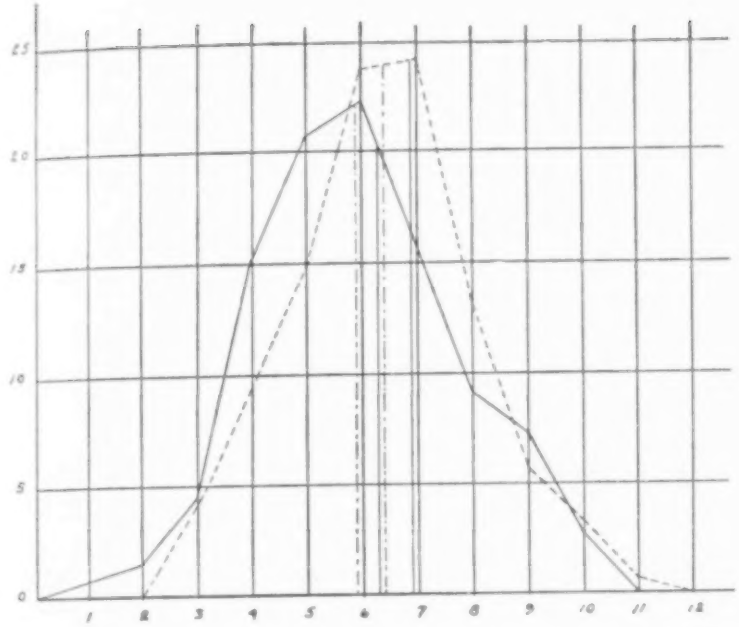

FIGURE 4. DISTRIBUTION OF PUPILS IN CLASSES XI-XXI (FULL-DRAWN LINE) AND IN CLASSES XXII-XXXV (BROKEN LINE) ACCORDING TO THE NUMBER OF PROBLEMS SOLVED IN THE HOTZ EQUATION AND FORMULA TEST. FULL-DRAWN VERTICALS SHOW MEDIANS AND BROKEN VERTICALS, ARITHMETIC MEANS. DATA FROM TABLE VI

fifth problem of the scale, the order of difficulty for these pupils corresponds to the order determined by the author.

Distribution of achievement of pupils in the Hotz Equation and Formula Scale.—Table VI and the accompanying Figure 4 show the distribution about the median for classes XI-XXI and XXII-XXXV. Of the pupils in classes XI-XXI, 0.8 percent succeeded in solving only one problem, while no pupil in any of the fourteen classes, XXII-XXXV, failed to solve at least three problems. No pupil in either group made a perfect score (12 problems right). Figure 4 shows that there is a remarkable similarity in the dispersion of the two groups and that they

TABLE VI. HOTZ EQUATION AND FORMULA SCALE. PERCENTAGE DISTRIBUTION OF PUPILS ACCORDING TO THE NUMBER OF PROBLEMS SOLVED

Number of Problems Solved Correctly	Classes XI-XXI	Classes XXII-XXXV
1	0.8	0.0
2	1.5	0.0
3	4.5	4.1
4	15.2	9.4
5	20.8	15.0
6	22.4	23.9
7	15.9	24.4
8	9.1	13.1
9	7.2	5.9
10	2.6	3.4
11	0.0	0.8
Number of "Rights"	1562.	1709.
Number of Pupils...	264.	267.
Arithmetic Mean...	5.92	6.40
Median.....	6.3	6.9

Tentative Standards.....	3-months 4.9	6-months 7.1	9-months 7.8

are comparable from the standpoint of distribution around the median.

Organization of cycles and evaluation of problems in the Rugg-Clark Formal Tests.—The results obtained from the twenty-five classes, XI-XXI and XXII-XXXV, when given the Rugg-Clark Formal Tests, may now be considered. In the design of these tests the authors used the "cycle" principle. The percent of pupils solving each problem in each cycle of each of the five tests was computed. The percents for Test 4 are shown in Table VII and in Figure 5. It is interesting to note how nearly equal the percents are for the two groups. The same thing was observed in the case of the Hotz Equation and Formula Scale. The number of problems solved of each type of problem in the cycles was also found. Percents were calculated showing what proportion the number of each type solved was of the whole number solved. These percents for Test 4 are given in Table VIII. A careful study of the percents, which are almost identical for the two groups, reveals the fact that the different types of problems in each test are of unequal difficulty for the

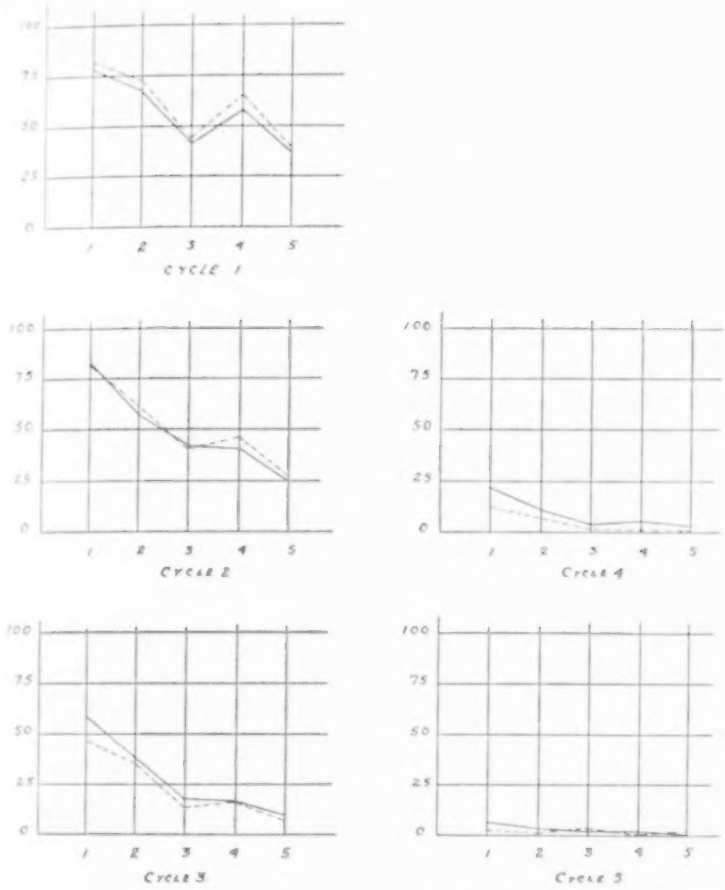

FIGURE 5. PERCENT OF PUPILS SOLVING CORRESPONDING PROBLEMS IN SUCCESSIVE CYCLES OF THE RUGG-CLARK TEST NO. 4 (SIMPLE EQUATIONS). DATA FROM TABLE VII

pupils tested. This is worthy of note in computing scores made by pupils taking these tests. Test 4 was selected because, of the five Formal Tests used, it is the only one designed in exact accordance with the "cycle" principle as described by the authors. Tables VII and VIII show clearly the relation existing between the total number of problems solved in this test and the number of each type of problem solved.

Variation in the rank of same classes measured by different instruments.—A study was also made of the variation in the rank of classes according to the tests of the different authors. Variations in both groups of classes were examined. Six of the eleven classes in the first group and five of the fourteen in the second either maintained the same rank or were displaced not more than one place. Some classes were displaced as much as five and six places. One class in the second group varied in rank 9.5 places. It is therefore not certain that the ability to solve algebraic equations is satisfactorily measured by either of the two tests.

TABLE VII. RUGG-CLARK FORMAL TEST 4 (SIMPLE EQUATIONS). PERCENTS OF PUPILS SOLVING CORRESPONDING PROBLEMS IN SUCCESSIVE CYCLES

Classes XI-XXI

Cycle Number	Problem in Each Cycle:				
	First	Second	Third	Fourth	Fifth
1	78.9	69.7	42.0	58.7	35.2
2	84.8	57.9	41.3	40.6	25.0
3	58.3	39.5	15.9	17.8	9.4
4	23.1	11.4	4.1	5.7	1.1
5	6.8	3.4	.8	1.9	....

Classes XXII-XXXV

1	83.2	73.4	44.6	66.3	37.0
2	84.2	61.1	40.4	45.7	25.0
3	46.1	35.2	14.9	17.1	8.2
4	13.5	8.9	2.6	2.2	0.7
5	2.6	1.9	1.1	0.7	0.7

TABLE VIII. RUGG-CLARK FORMAL TESTS. PERCENT OF ENTIRE NUMBER OF CORRECT SOLUTIONS MADE ON EACH TYPE OF PROBLEM IN TEST NO. 4

Type of Problem	Classes XI-XXI	Classes XXII-XXXV
1	34.3	32.0
2	24.8	25.1
3	14.2	14.4
4	17.0	18.4
5	9.7	10.1

Graph Tests

Order of difficulty of problems.—Table IX gives the percent of pupils in classes XXXVI to XLVI who solved each problem in the Hotz Graph Scale and the Rugg-Clark Graph Test. Figure 6 shows graphically the percents for the 283 pupils in each test. Five of the classes took the Hotz test first and six took the Rugg-Clark test first. In every class the two tests were given during the same period. The attitude of the pupils and a study of the papers received indicated that ample time was given for the Hotz test. It seems probable, therefore, that the percents given for this test indicate the order of difficulty of the problems for the pupils taking the test in this investigation. According to the results from the eleven classes and 283 pupils, the Hotz order of difficulty is affirmed in every case but one. In the Rugg-Clark test most of the pupils seemed helpless and were unable to use all of the time allotment. The results, however, substantiate the order of difficulty of the problems as reported by Rugg and Clark.

TABLE IX. PERCENT OF PUPILS SOLVING EACH PROBLEM. CLASSES XXXVI TO XLVI

Hotz Graph Scale		Rugg-Clark Graph Test	
Problem Number	Percent Solving	Problem Number	Percent Solving
1	94.7	1	10.8
3	75.3	2	4.9
4	86.6	3	4.2
5	51.9	4	2.5
6	47.3	5	0.9
7	36.4	6	0.2
10	15.9		
11	11.3		

Distribution of achievement of pupils.—Table X and Figure 7 show the distribution of achievement of the 283 pupils in the solution of problems in the two graph tests. The median number of problems solved in the Hotz test was 4.7. The median for the most efficient class, XLI, was 6.6. The author's tentative median standard is 5.6 for pupils who have studied algebra nine

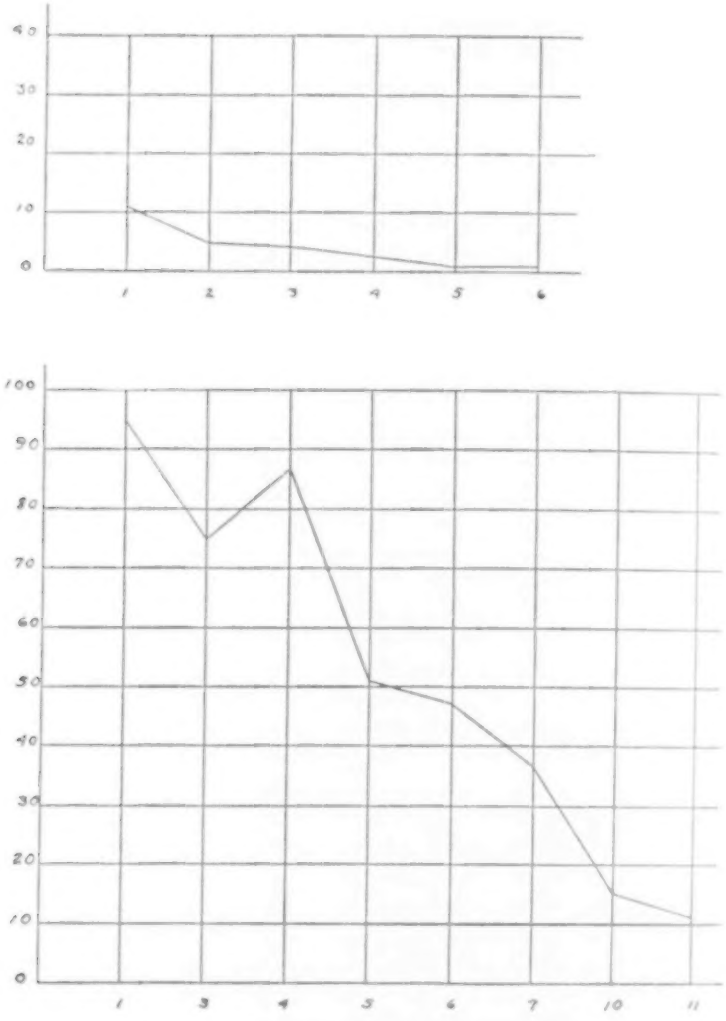

FIGURE 6. PERCENT OF PUPILS SOLVING EACH PROBLEM IN THE GRAPH TESTS. UPPER CURVE FOR THE RUGG-CLARK TEST; LOWER CURVE FOR THE HOTZ TEST. DATA FROM TABLE IX

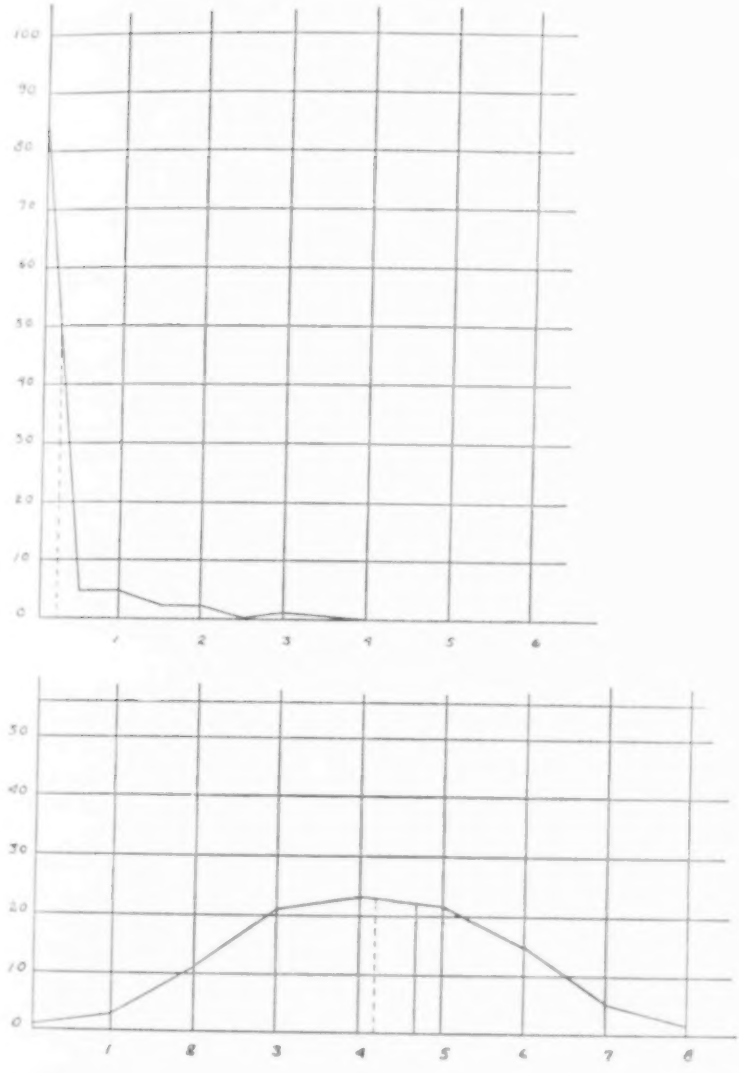

FIGURE 7. DISTRIBUTION OF PUPILS ACCORDING TO THE NUMBER OF PROBLEMS SOLVED IN THE GRAPH TEST. UPPER CURVE IS FOR THE RUGG-CLARK TEST; LOWER CURVE FOR THE HOTZ TEST. FULL-DRAWN LINES SHOW MEDIANS AND BROKEN LINES, ARITHMETIC MEANS. DATA FROM TABLE X

months. In the Rugg-Clark test the median score for class XLI was 1 problem solved in the 12 minutes allowed. The median score made in this test by all other classes was 0. The Rugg-Clark tentative standard, as determined by the average of 27 schools, is 1 problem for each 3.1 minutes. The 24 pupils in class XLI solved 30.5 of the 66.5 problems solved correctly by the 283 pupils in the Rugg-Clark test.

Tables IX and X and Figures 6 and 7 show very clearly that the Rugg-Clark Graph Test did not satisfactorily measure the pupils tested and that the Hotz Graph Scale did measure them. In the Rugg-Clark test 83 percent of the pupils failed to solve a single problem correctly. The above tables and figures show that the Hotz test gave a fairly normal distribution. Only 0.7 percent of the pupils failed to solve at least one problem and only 1.1 percent succeeded in making a perfect score.

TABLE X. PERCENTAGE DISTRIBUTION OF PUPILS ACCORDING TO THE NUMBER OF PROBLEMS SOLVED

Hotz Graph Scale		Rugg-Clark Graph Test	
Problems Solved	Percent	Problems Solved	Percent
0	0.7	0	83.0
1	2.5	0.5	5.3
2	11.0	1	4.6
3	20.1	1.5	2.1
4	23.0	2	2.1
5	21.9	2.5	0.7
6	14.1	3	1.1
7	5.6	3.5	0.7
8	1.1	4	0.4
Number of "Rights"	1186.	....	66.5
Number of Pupils	283.	....	283.
Mean	4.19	....	0.24
Median	4.7	....	0.
Tentative Standards 4.5-months, 2.8; 9-months, 5.6			

Discussion of Results

Validity.—The results for all the tests were carefully examined in order to determine their validity in measuring achievement in first-year algebra.

1. The problems in each of the three Hotz Scales are supposed to be arranged in order of difficulty. For the most part they were found to be so arranged. The problems in the Rugg-Clark tests were found to be less accurately evaluated in difficulty. Figures 1, 5, 6, and 7 represent graphically the variation in order of difficulty.

2. As to distribution of achievement of pupils tested, it was found that the three Hotz Scales gave fairly normal distributions of scores. The distributions in the Rugg-Clark problem and graph tests were irregular. The median score of zero made by the 283 pupils given the Rugg-Clark Graph Test, considered in connection with the Hotz results, justifies the conclusion that this test did not provide a valid measurement of graphing ability.

3. The validity of scores based upon the number of problems solved in the Rugg-Clark Formal Tests is not certain. The pupils were not uniform in parts of cycles solved. The problems are of unequal difficulty and are not arranged in order of increasing difficulty.

4. A detailed study of the ranking of both classes and individuals revealed the fact that there was less variation for scores based on the established value of each problem than for scores computed in terms of the number of problems solved.

5. A careful examination of the Rugg-Clark Tests 10, 11, 12, and 13 revealed many variations from the "cycle" principle as described by the authors. To illustrate: Test 12 consists of seven cycles of four problems each. Types 1 and 4 do appear in the same order in the several cycles. Type 3 is the same for cycles 1 and 7. It appears in the second place in cycles 2 and 4; is not found at all in cycles 3 and 5; and appears with one change of sign in cycle 6. Type 3 of cycles 2 and 3 is the same. It appears also in the second place in cycles 3, 5, and 6. Type 4 is the same in all the cycles; but the same type is found also in the third place in cycles 4 and 5 and in the second place in cycle 7. On pages 69 and 70 of their monograph,[1] the authors assert that

[1] H. O. Rugg and J. R. Clark: *Scientific method in the reconstruction of sixth-grade mathematics.* (Supplementary Educational Monographs, University of Chicago Press, Vol. II, No. 1) 1918. 189 pp.

failure to follow the principle exactly causes "quite different percentages of failure on the part of pupils solving the examples."

Economy.—A comparison of the tests with respect to economy of time showed:

1. The Rugg-Clark Formal Tests were the more burdensome to give and to take. This set of tests required ten minutes the first day and practically the entire period the second day.

2. The time required to score the papers received from the two problem tests was approximately the same. For the equation and formula tests approximately three times as much time was required to score the Rugg-Clark papers as to score the Hotz papers. No comparison could be made for the graph tests on account of the small number of problems solved in the Rugg-Clark graph test.

Difficulties.—Some of the difficulties encountered in the use of the tests were:

1. No directions are furnished by the authors for giving or for scoring the Rugg-Clark problem test.

2. Scoring in partial credits is more difficult and the fairness to pupils may be mainly apparent. It is not clear that the two parts of any of the problems are of equal value.

3. In the Rugg-Clark rate tests pupils are not instructed by the authors as to the form in which to leave answers. This lowered scores made by some pupils and caused difficulty in scoring.

4. The use of the word "equation" in problem 5 of the Rugg-Clark problem test caused difficulty. Some teachers were of the opinion that the use of the term "roots" in the Rugg-Clark Graph Test was the cause of failure on the part of some pupils to solve the problems in this test.

Diagnosis—

1. For diagnostic purposes no important difference between the problem tests was apparent. They represent about the same variety of algebraic statements and equations.

2. The Rugg-Clark Formal Tests furnish a greater number of problems of various types of equations than does the Hotz Equation and Formula Scale, and provide more diagnostic information regarding ability to solve algebraic equations.

3. The Hotz Graph Scale gave information as to ability to read graphs, to locate points when the coördinates are given, to find the coördinates of points, to plot linear equations and to solve problems by the use of graphs. This was done through the use of separate questions. The information furnished was thus of definite diagnostic value. The Rugg-Clark Graph Test is a test in finding roots by drawing graphs of simultaneous equations. The several steps involved in the process are not separated. Hence little explicit diagnostic evidence was obtained from this test.

4. Before any of the Hotz Scales can furnish much diagnostic evidence, pupils must have studied algebra at least a few weeks. Thus such evidence comes late to be of real use for needed changes in teaching emphasis. The Rugg-Clark Formal Tests may be given when the various types of equations are being studied. For such use it would be better if these tests were printed on separate sheets instead of in book form.

CLASSIFICATION OF KINDERGARTEN CHILDREN FOR FIRST GRADE BY MEANS OF THE BINET SCALE

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In the fall of 1920, at the request of superintendent W. A. Greeson of Grand Rapids, Michigan, Dr. Charles Scott Berry of the University of Michigan was secured to train approximately sixty kindergarten teachers and their assistants to give the Binet test. Through the united efforts of these sixty teachers, assisted by the kindergarten supervisor, Miss Annie J. Blanchard; her assistant, Miss Elizabeth Webster; and Mrs. Cordelia Creswell, supervisor of mental testing, 2029 kindergarten children were tested by June, 1921.

After the testing had been completed, the mental ages were reduced to a September-first basis and classified into three groups as follows: (1) in the X or highest group children seven years or older mentally; (2) in the Y or middle group children six to seven years old mentally; (3) in the Z or lowest group children five and a half to six years old mentally.

Table I shows the distribution of the 2029 kindergarten children according to mental and chronological ages.

TABLE I. THE DISTRIBUTION OF 2029 KINDERGARTEN CHILDREN ACCORDING TO MENTAL AND CHRONOLOGICAL AGES

Chronological Ages	Mental Ages					
	Below 5½	5½-6	6-7	7 and above	Totals	Percents
Below 5½	33	29	41	13	116	6
5½-6	79	100	255	111	545	27
6-7	103	145	530	399	1177	58
7 and above	55	23	58	55	191	9
Totals	270	297	884	578	2029	
Percents	13	14	44	29		100
Groups	Sub-Z	Z	Y	X		

It was recommended that the principal and the kindergarten teacher, after taking all factors into consideration, should either place the children who did not test five and a half years according to their mental age on September first, in one of the groups or leave them in the kindergarten. The kindergarten teacher was also privileged to reclassify a child whose mental test score placed him in a group to which, in her opinion, he did not properly belong.

The Work Assigned to Each Group in the First Grade

All groups were to do the same type of work for the first ten weeks of school, i. e., regular first-grade work. This was done in order that first-grade teachers' judgments could be utilized in the experiment. During this probationary or trial period, the first-grade teacher was privileged to move a pupil from one group

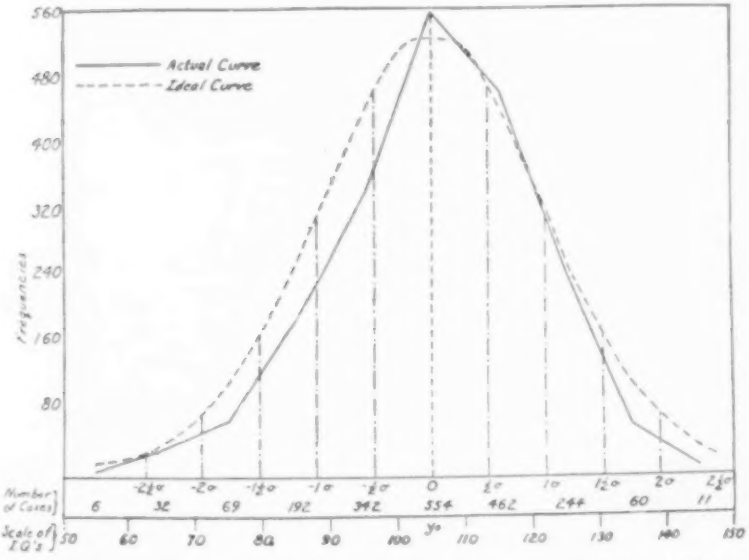

FIGURE 1. THE IDEAL CURVE SUPERIMPOSED ON THE ACTUAL CURVE OF DISTRIBUTION OF THE INTELLIGENCE QUOTIENTS OF 2029 KINDERGARTEN CHILDREN OF GRAND RAPIDS, MICHIGAN. TESTED JANUARY TO JUNE, 1921.

to another whenever in her judgment the child did not properly belong in the group to which he had been originally assigned. After ten weeks were over, or even before, if the first-grade teacher had settled definitely on the members of each group, it was recommended that the Z group go more slowly, doing *at least* a half-year of first-grade work in a year and as much more as the group was able to do. The other two groups were to do regular first-grade work, enriched as much as seemed expedient.

Actual Classification

Even though 2029 kindergarten children were tested for first-grade work it did not prove feasible to form X, Y, and Z groups for each school. In schools in which there was only one first-grade teacher it was not deemed advisable to form three groups from their small number of pupils. Some of the teachers in the smaller buildings formed two groups only, an upper and a lower, designated A and B. The reason given for not forming three groups where there was only one teacher in the first grade, was that to do so would cut down the actual recitation periods of each group 50 percent. For example, three groups reciting their reading lessons for 20 minutes each consume 60 minutes. Were these same pupils divided into two sections, each section could continue for 30 minutes with no longer school day. That is, two 30-minute periods equal three 20-minute periods.

In schools having two first-grade teachers, the pupils could have been divided first into three groups, X, Y, and Z. One teacher could then have taken the X's and high Y's, while the other could have taken the low Y's and all the Z's. Unfortunately, or otherwise, this arrangement was not followed by all the larger schools. Some assigned three groups to each teacher, when it was possible for them to have formed two groups only for each teacher.

In consequence of the above optional types of classification, only 1129 or approximately 64 percent of the first-grade children were actually classified on the X, Y, and Z basis. Table II shows the actual classification of these children.

There were, however, 213 of these 1129 pupils who were not classified according to their mental ages but were placed in groups X, Y, and Z according to the judgments of the kindergarten teachers. The numbers representing these pupils are italicized in Table II. Of the 71 children who were below the mental age of the Z group, 64 were placed by the teachers in Z, 6 in Y, and 1 in X. Of those having the mental age of the Z group, 43 were placed in Y; while of those having the mental age of the Y group, 27 were placed in Z and 45 were placed in X. Twenty-seven of those having the mental age of the X group were placed by the teachers in the Y group. The remaining 916 or 81 percent were placed in the X, Y, and Z groups according to their mental ages.

Stability of Grouping

During the first ten weeks it was necessary to alter this original grouping to some extent. Of the 64 pupils having a mental age of less than five and a half years, who were placed in group Z, 24 were transferred to Y, or up a group, while 1 of the 6, placed originally in the Y group, was transferred to Z, or down a group. The changes within each group are recorded in Table II. Of the 213 pupils placed according to the kindergarten teachers' judgments, 25 were later transferred to a lower group, while 35 were placed in a higher group. That is, 153 or approximately 72 percent of them remained in the group in which the kindergarten teachers had placed them. In other words, approximately three out of every four remained unchanged.

Of the 916 placed in groups according to their mental ages, 56 were transferred to a higher group; while 82 were changed to a lower group, making a total of 141 transfers. Therefore, 775 or 85 percent of these remained unchanged. If we consider the number of changes within each group we find that 22 percent of the Z group were subsequently changed to another group; while 17 percent of those originally placed in the Y group and 16 percent of those in the original X group were likewise transferred.

TABLE II. THE CLASSIFICATION OF 1129 KINDERGARTEN CHILDREN ON THE X-Y-Z PLAN FOR FIRST-GRADE WORK

Mental Ages	Groups									Totals (original grouping)	Per cent	Total numbers transferred
	Z			Y			X					
	Original number	Number transferred to groups:[a] Y	X	Original number	Number transferred to groups:[a] X	Z	Original number	Number transferred to groups:[a] Y	Z			
Below 5½ years	*64*[b]	*24*	*0*	*6*	*0*	*1*	*1*	*0*	*0*	71	6	25
5½–6	109	15	0	*43*	*3*	*9*	0	0	0	152	14	27
6–7	*27*	*2*	*2*	499	41	38	*45*	*11*	*1*	571	50	95
7 and above	0	0	0	*27*	*4*	*3*	308	41	3	335	30	14
Totals	200	41	2	575	48	51	354	52	4	1129	100	198

[a] The changes indicated refer to shifts which were made during the first ten weeks of the first-grade work.
[b] The numbers in italics refer to pupils who were placed according to teachers' judgments.

General Statements Concerning Kindergarten Teachers' Judgments and Test Scores

Some are likely to conclude from these data that kindergarten pupils are grouped better by means of the Binet test scores than by kindergarten teachers' judgments because 85 percent of those placed in groups according to their test scores remained unchanged, while only 72 percent of those placed in groups other than where their test scores should have placed them, remained constant. It is unfair to draw such a conclusion from these data because in all cases the kindergarten teachers' judgments were utilized, for it was with their approval that a child was placed in the group which accorded with his mental age. Doubtful children only were placed in groups other than the one indicated by their test scores. If a kindergarten teacher felt that a child was not strong enough to keep up with the X group, even though he received a score which would place him in the X group, she recommended him for the Y or Z group. If she felt that a child had a language difficulty and did not test up to his ability she oftentimes placed him in a group above the one indicated by his test score. Other exceptional cases were similarly handled.

The conclusion which can be drawn from these data, however, is that it is remarkable that the Binet test, which takes approximately only 40 minutes to give to a kindergarten child, can so accurately group children according to their capabilities. Since only 198 out of 1129 cases were changed during the first ten weeks, there were approximately only 18 percent of the children who were readjusted. In other words, four out of every five were accurately placed according to their original classification.

Reasons for Testing in the Kindergarten

In the main, there are three reasons for testing kindergarten children for purposes of classification in the first grade:

1. The percent of failures in the first grade is very large. In fact, it is from two to three times that in any other elementary grade.

2. It is at least suspected that we are asking a great many children to do first-grade work who are not sufficiently developed mentally to do so.

3. First-grade teachers need assistance in diagnosing children's difficulties since the children come to them unsorted.

A report from first-grade teachers, relative to the original classification and changes made by them during the first ten weeks was requested. One important question asked, was, "Do you feel that this grouping by means of the Binet-test results has been of assistance to you? If so, in what way?" Forty-three of the fifty-eight first-grade teachers gave positive answers in favor of it; fifteen left the answer blank; while none gave a negative answer. Granting that all the fifteen who left the answer blank were not in favor of it (which is altogether improbable) the fact still remains that approximately 75 percent favored it.

Some of the typical answers made by first-grade teachers concerning the testing were:

"I feel it has been a great benefit by throwing light on what we should expect of children. If a child tests low, we know we must allow him more time to complete a grade. If he tests normal, but is not doing good work, it should be our duty to find out why and urge him to do better. If he tests superior, he should be given a chance to make the next grade with a little extra help."

"Yes, I think the grouping by means of the Binet test is most valuable. It gives the teacher some definite knowledge of the child and where to place him. This, of course, saves much time as well as giving the valuable information which helps so much in knowing each individual child."

"This means of grouping has been of assistance in the discovery of the very slow pupils before they become bewildered by trying to keep up with the brighter children. On the other hand, it does not subject the bright child to the dulling effect of waiting when a slow pupil is up for recitation."

"Yes, we have two 1-1 rooms at———————. For several years we have aimed at the same grouping that we have this year viz.: X and high Y pupils in Miss ———————'s room and the lower Y and Z pupils in my room. This year there has been less need for transfer from room to room. While I have found considerable variation within the assignments made to me as Y and Z groups, the X pupils seem to have been well sorted out."

"It has been of great assistance to me. Each year I have had sent to me for the advanced group children in whom the kindergarten teacher had mistaken manual dexterity for mental ability. Shyness is also often taken for slowness."

"Yes, because the children are better classified."

"I feel that this grouping has been of assistance to me. It has saved much time in having a definite organization of pupils at the beginning."

"At least a week of time was saved at the beginning of the term which is usually used in the adjusting of classes. Children who need special attention are brought to notice at the very beginning of the year."

"Yes, it is much easier to handle a large number in a class if they are of nearly the same type mentally. Because of this grouping we are able to work with two groups instead of three or four as formerly in first-grade rooms."

Advantages Summarized

1. Considering the report as a whole there seem to be several advantages to be gained from this testing. Great assistance is furnished the first-grade teacher in analyzing the child. Mere personal opinion is not always a safe guide in the analysis of children's abilities to do first-grade work for there are children who are brilliant in a general sense but dull in a technical sense. That is, by travel, picture-books, magazines, and fine home training they have received a general training far beyond that of children who are much older than they. But when it comes to teaching them that "c" should sometimes be given the sound of "k" and sometimes the sound of "s;" or that 9 and 5 are 14, etc., they fall far short of their teacher's expectations. On the other hand, many children are brilliant in a technical sense but dull in a general sense. That is, through lack of picture-books at home, magazines and travel, combined with indifferent home-training their limited experience with things in general makes them appear dull. But when asked to read page four in their reader, they can not only do it well but they can also reproduce every essential idea of the page, or if asked to give the sum of any of the forty-five combinations, they can do it without hesitation.

2. It is possible by means of the testing to sort out with a high degree of accuracy the children who are below five and a half years mentally and to permit only those who are healthy and seem mentally strong to go on to the first grade.

3. Much time is saved in the grouping of the children at the beginning of the semester. Almost all the experimental grouping is eliminated. Several teachers say that from a week to ten days is saved in the organization of their classes.

4. The teacher has an impersonal check on the teachability of the child. It sometimes happens that children who are teachable will not learn. Some children see no reason for learning to read. Their wants and pleasures are satisfied without knowing how to read, and unless the work can be motivated they put forth little or no effort to master the abstractions of reading. The following incident which happened in one of our schools illustrates the point. A short time ago a first-grade boy who had shown by his test that he was a perfectly normal boy was not learning to read. The teacher had used all her powers in attempting to induce him to try. The principal was called upon for assistance. When asked why he didn't want to learn to read, the boy replied that it would not be necessary for him to know how to read at the work he was going to do when he grew up. When asked what he was going to do, he said he was going to be a clerk in a grocery store like his father. But the principal said, "You will need to know how to read the orders brought in by little boys and girls to your store and also orders which are taken over the telephone, won't you?" The boy was told to talk the matter over with his father at home that evening. On returning to school the next morning he said, "Well, if that's the way of it, I guess I'll learn to read,"—and he did. The principal, and the first-grade teacher of this school, understand the meaning of Binet testing; and through test results they are able to distinguish between apparent and real difficulties. The impersonal feature of the test proves to be a "life-saver" in many cases.

5. A further advantage is to be found in having groups mentally homogeneous to begin with. It goes without saying that when first-grade pupils are grouped according to a teacher's judgment, the children are grouped mainly on performance and effort. When children of similar mentalities are grouped together, the

teacher feels that she should do all in her power to bring out a performance commensurate with the child's mentality before recommending him to a slower group. The child, therefore, has the proper chance with his mental equals in beginning his school life.

6. When there are two first-grade teachers in a building the plan of cutting down the number of groups for each teacher can be used. That is, it is not necessary for each teacher to have a fast, middle, and slow group. One teacher can take the fast and a part of the middle group while the other can take the other part of the middle group and the slow. In this way each teacher will have but two groups.

7. Possibly the greatest advantage lies in the fact that pupils in the first grade may be advanced as rapidly and only as rapidly as their mental development permits. This is not exactly true with each individual, but it is true with respect to the three groups as wholes. In other words, there is opportunity for enriching or accelerating the work of the X group, commensurate with its mental age; of doing ordinary work with the Y group; and of going slowly enough with the Z group so that the amount of work the pupils cover in a semester is within their grasp. Therefore, from the standpoint of habit formation in the thinking processes both as to speed and thoroughness, and from the standpoint of hygienic mental training and development from every angle, children are fed on an educational diet which agrees with them and enables them to grow naturally. In other words, the bright child is not held back and the dull one pushed ahead as is usually the case when children are grouped at random or by unscientific methods. If it be true, as some psychologists say, that bright children oftentimes have fixed their habit of reading as to speed, eye-movement, etc. by the time they have finished the third grade, then great injustice is being done to bright children all over the country since they are forming the habits of ordinary children because they are trained only as ordinary children. The ideal school would be one in which every child progressed according to his own mental level of intelligence and rate of mental

development. This, at present, is impracticable, especially if carried out in its minutiae, since such an organization would undoubtedly entail large expense. The Winnetka schools, near Chicago, are trying out this experiment.

A step can be taken in that direction, however, by grouping together children who vary no more than a year or a year and a half in mental age, instead of following the usual practice of putting children into the same class who differ by as much as three or four years in mental abilities.

LETTER-WRITING: A CURRICULUM STUDY IN ENGLISH COMPOSITION[1]

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If we assume that the functional viewpoint in the construction of a curriculum is the correct one, then it becomes one of the objectives of the course in English composition to develop the ability to write a good letter, since the letter is the commonest form of written expression employed in the activities of a normal life.

But what is a good letter?

No satisfactory standard of measurement has been evolved. Some individual opinions have been hazarded and certain desirable characteristics have been set down in casual and isolated references. But, in general, letter-writing as an art has not been seriously studied with a view to teaching it in the schools.

This is partly explainable by the fact that a general skepticism prevails, or has prevailed, concerning the possibility of discovering a "technique of letter-writing" which can be adapted to instruction. "Personality is the secret of a good letter" has been the aphoristic declaration with which any proposal to teach letter-writing has been met. And the statement has been generally accepted as a comfortable solution of what otherwise would be a new English problem. But the art of letter-writing, like other arts, is a mode of self-expression and should be subject to effectual and helpful analysis. It is true that it is more intimate, so far as individual relationships are concerned, than painting or poetry; and, for that reason, the contention that it becomes the special vehicle of personality seems to have some logical basis. The argument, however, is not wholly tenable. There is often as much affectation among friends as before the public. The personality of Keats pervades *Endymion* as thoroughly as it does his letters. But even if one fully admits the personality argu-

[1] This study was conducted by the Stephens College Department of Research under the direction of Dr. W. W. Charters.

ment, a careful study proves itself fruitful through the discovery of certain common characteristics and devices employed to advantage by expert users of the art.

The present study was undertaken with a view to establishing well-defined, particularized objectives in the teaching of letter-writing to college students—that is, to discovering by the process of analysis and the compilation of expert opinion a "technique" of the art by which the general quality of letter-writing may be improved.

Successful teaching, however, depends not only upon a consciousness of an objective but also upon the proper determination of the subject matter. What shall be taught about letters?[2]

The materials of this study consist of: Group I, approximately one hundred and fifty letters contributed by women of recognized leadership throughout the country[3]; Group II, modern collections of literary letters; Group III, one thousand letters from young women of approximately college freshman standing.[4]

The analysis of the first group of letters revealed the prevalence of certain common characteristics. The analysis of literary letters contained in modern collections (Group II) lent validity to the findings of the first analysis by discovering substantially the same characteristics as those found in the letters of Group I—in addition to certain niceties of literary style which many of the letters of the first group did not exhibit. The analysis of the

[2] An examination of fifty textbooks in composition and rhetoric revealed the fact that less than four percent of the space in texts is devoted to letter-writing—and this four percent is almost entirely given over to the *forms* of business correspondence and to formal notes. A diligent search through the pages of these texts disclosed only casual references to *content* characteristics of the letter. Such adjectives as *clear, tactful, courteous, sincere, unstudied, vivid, full of life,* and *pleasing* are used to describe the style and quality of good letters. Save for these brief and incidental records of an author's individual opinion, little help for the amateur letter-writer is to be found in the texts except in matters of form and grammatical correctness.

[3] These were current letters from the private correspondence files of well-known women. The letters were contributed as samples of "good" letters. They were very kindly offered in response to requests for cooperation and were of invaluable assistance in the study.

[4] Two hundred and fifty of these letters were social letters and were obtained through the confidential cooperation of one hundred and fifty of the freshmen English students at Stephens College. Seven hundred and fifty were business letters obtained from the college office.

third group discovered certain general weaknesses of student letters and established the "mechanical" needs of college students so far as letter-composition is concerned. It also made possible the determination of a norm of accomplishment which could be used as a basis of comparison in judging other groups of student letters.

Characteristics of Good Letters as Determined by an Analysis of Groups One and Two

It is not to be supposed that the characteristics discussed in the following sections were found in every letter which was examined, but they recurred with noticeable frequency throughout both groups. A count was taken on a random sampling of the letters and the frequency of each characteristic was found to be at least one-half. In other words, each characteristic here discussed occurred in fifty percent or more of the letters examined.

Courtesy.[5]—In intimate or friendly letters this amounts to much more than formal politeness. It implies thoughtfulness, solicitude, consideration for others, a well-bred deference to the epistolary rights and interests of the person to whom the letter is directed. Some of the devices, or ways, by which that attitude of mind which is here denominated as courtesy may be expressed in a letter are[6]:

1. Give due attention to the points in the letter which is being answered.
2. Never fail to express expected congratulations.
3. Never fail to acknowledge obligations. Show a sense of gratitude.
4. Express good wishes.
5. Make inquiry about matters which are of the first importance and interest to the recipient of the letter.
6. Apologize, if there is any occasion for it.
7. Express or imply respect, esteem, or affection.
8. Adapt subject matter to the age and interests of the reader (e.g., letters to children).

[5] These characteristics apply primarily to social correspondence since the study is made largely in terms of the friendly, or social, letter.

[6] All devices listed were utilized in letters examined—not all of them, of course, in any one letter.

Informality.—One naturally expects informality in social letters. But it requires a nice sense of discretion to be informal without being "cheap." Informality breaks down distance and insinuates a comfortable sense of nearness. The indulgence of a tendency to be natural plus a certain caution against inelegant expressions should produce a desirable informality.

"An odd leaf of a volume, and that volume your friend," says Thoreau in characterizing one of his own letters. But that odd leaf must bear the scrawls and pencilings, the sly smiles and whimsicalities, dictated and inspired by a human soul off-duty in an attitude of unaffected comfort. Naturally there are times when the conventional asserts itself. In fact it may dominate the style of the letter without destroying certain touches of informality that characterize occasional sentences. Perhaps this element of informality had better be called a "flavor" rather than a style of composition characteristic of an entire letter or series of letters.

In the letters of Group I certain interesting "ways" of being informal were observed:

1. Use of colloquialisms, or conversational expressions.
2. Use of invented expressions.
3. Use of pen sketches and illustrations.
4. Elimination of over-formal headings and conclusions.
5. Use of figures of speech humorously exaggerated.

Humor.—This characteristic is possibly allied to informality. But it is certainly evident both in the published letters and in those collected from the personal correspondence of prominent women. The familiar letter affords an excellent channel for humorous expression. In a mood of delightful relaxation, the letter-writer often becomes a mental contortionist, producing smiles by rapid revolutions of thought, by exaggeration, or by some impossible comparison. Following are some of the common sources from which letter-writers draw their humor:

1. They smile at the expense of human weakness (sympathetically, of course).
2. They depict absurd situations.
3. They exaggerate—intentionally.
4. They juxtapose apparently unrelated thoughts.

5. They make reference to amusing experiences.
6. They indulge in plays upon words.

Humor, as a condiment of letter-writing, is evidently important if one may judge by its prevalence in the letters studied. Its use is not restricted to the letters of the professional humorist—whose entire letter may billow with laughs—but it is freely and liberally used (even in letters of serious purpose) by Lamb, Stevenson, Moody, and practically all writers of pleasing letters.

Opinions.—The letters of Groups I and II were distinctly opinionative. In one of Bayard Taylor's letters he apologizes because the letter contains so little besides news. And Christina Rosetti says: "News is not my forte." Even in those letters (like George Meredith's) which seem to be especially "newsy," the thing that gives life to the letters is the running comment—the exposition or implication of attitude. A suggestive and illustrative passage from Meredith's letters may be cited here. In telling of a tramp across the hills with some of his eminent friends, he writes: "They are men of distinction in science and literature. Tramping with them, one has the world under review as well as pretty scenery." While it is not necessary for one to have "the world under review" in the letters he writes, it *is* desirable that he show an intelligent responsiveness to that small part of it which has come under his direct observation. Opinionative letters are intellectual reactions toward life. A letter which is merely "newsy" may be only a bulletin of events.

The best letters are likely not to be descriptive[1] or wholly narrative, but they will challenge the interest by an exposition of attitude or a casual interpolation of opinion relative to matters that concern (either directly or indirectly) one or both parties to the correspondence. It is well, however, to keep in mind Mr. Clarke's caution (Clarke, Thomas Arkle. *When You Write a Letter*); viz., that a letter should not be a philosophical essay.

[1] Very little description was found in the letters studied. This may be due to the fact that description is a very difficult form of discourse for most people to use clearly and effectively. Or it may be due to a feeling on the part of writers that too much description "clogs a letter" (as Wordsworth says).

For it may be that in attempting to write "opinionative" letters, we shall turn serious-minded and approach our task like the plenipotentiaries of world powers negotiating peace or war.

Let it be understood that the "newsy" letter is not taboo. To convey news—well-sorted news—is one of the motives of correspondence. But ordinarily news should be considered simply as subject matter in the rough. It may be refined by proper organization, by opinionative comment, by humor, etc. But without embellishment it becomes the dry rot of social letter-writing.

Optimism.—It has been remarked that the letter is a vehicle of "fugitive moods."[3] It is a verbal chameleon against the changing hues of human temperament. The general prevalence of optimism in the letters of Groups I and II of this study may be ascribed to the fact that optimism is naturally the dominant mood of the normal mind. A few of the letters, however, are distinctly dispirited. While there is, apparently, a place for the letter expressive of various moods—moods of cheerfulness or discouragement—it may be set down as a safe conclusion that a courteous consideration of the feelings of the reader demands only a rare indulgence in despondency. The optimistic letter has immeasurably greater possibilities of winning interest and giving pleasure than the letter of deep-tinted "blues."

The appropriateness of the mood may depend upon the truth of the mood. True reactions of the writer often make expressions of discouragement necessary. There is an intimacy about the social letter which should forbid an *affectation* of optimism. If correspondence is to be promoted, real and truthful expressions of attitude are necessary. But assuming that cheerfulness is the *true* mood of normal life, it should find a large place in the friendly letter. At all events, the significant fact remains that a cheerful outlook on experience characterized practically all the letters of Group I—letters which were selected by competent critics as marking high standards of correspondence.

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[3]Dawson, W. J. and C. W. *The great English letter writers.* Vol. 1, p. 31.

Few centers of organization.—Another conclusion reached through an examination of letters of Groups I and II is that good letters show remarkably few instances of loose organization. The amateur's letter may be a miscellaneous collection of paragraphs—a faithful record of disconnected facts. But the best practicers of the art favor the "linear" letter—the letter which confines itself to few and closely unified subjects of thought. It is conceivable that a "gossipy" letter might sometimes be of interest to a correspondent, but in such instances the choice bits become merely the illustrative and coherent development of the general theme of "gossip." Matters entirely foreign to the main theme of a letter may be left for a later communication, or thrown into a postscript, or treated in a very subordinate or incidental manner. The point is that the dominant theme of the letter should not be swamped with a flood of incoherent details.

Form.—Apparently there are almost as many variations of good form in letter-writing as there are good letter-writers. The most common form employed is herewith illustrated:

Columbia, Missouri,
September 22, 1922.

Dear Anna:

When I heard that your had won the prize offered by .....
.....
.....

Cordially yours,
Mary K.

The heading, complimentary close, and salutation were found to change with the degree of intimacy or familiarity. The following salutations are arranged in what appeared to be the ascending order of formality: *My dear Anna, Dear Anna, Dear Miss Malvern, My dear Miss Malvern.* In very intimate letters, strikingly informal salutations are often found, such as nicknames, initials, etc. The complimentary close may also become less conventional, such expressions as *With love, Ever yours, Affectionately,* etc., being employed.

The more formal salutations in the letters were usually preceded by the name and address of the person to whom the letter was written; e. g.,

Columbia, Missouri,
September 22, 1922.

Miss Anna Malvern,
Paducah, Kentucky.
My dear Miss Malvern:
When I heard that you had won the prize offered by .....

In the replies of the women through whose assistance this study was made possible, twenty variations in form were noted in heading, salutation, and address. The most prevalent usage, however, conformed to the foregoing illustration.

One woman very well known in the field of modern literature writes that many "scrappy notes" and "illegible scrawls" which she has received from certain contemporary celebrities and which entirely ignore the matter of form are among the best letters she has received. She defines a good letter as "any letter which promotes correspondence between people." This is a thoroughly tenable attitude. Content and personal interest are greater factors in letter-writing than is the matter of form; yet most rhetorics insist upon inverting the emphasis. They teach arbitrary forms and ignore content.

However, the laws of form (including punctuation, capitalization, spelling, legibility, neatness, paragraphing, proper headings, etc.) are important and they must be taught. For the world at large is not so generous in its tolerance of "scrappy notes" and "illegible scrawls" as the woman, just referred to, who treasures them among her correspondence keepsakes. A fair conformity to such laws is to a letter what conventional manners are to a gentleman—a non-essential of character but an index of good breeding.

Analysis of Student Letters

In regard to formal error.—A careful examination of two hundred and fifty social letters written by students (young women of approximately college freshman standing) was under-

taken with a view to discovering the prevailing weaknesses in the letter-writing of those students who were ready for the college course in English. In this study two things were observed: (1) the amount of technical error found in the letters, and (2) the failure of the writers to employ interest devices or methods which were found to be generally characteristic of the "good" letters used in the first part of the study.

The categories of error used in the tabulations (see Table I) are practically the same as those established by a previous study.[9] The ease with which the errors lend themselves to this classification is the chief argument for the adoption of these categories for use in such studies as the present one. It also facilitates the comparison of results when such comparison is desirable.

In addition to the 250 social letters, 750 business letters were examined. These letters were written by high-school seniors who were considering entering college. The analysis of these letters furnished additional data concerning the distribution of

TABLE I. THE RELATIVE PREVALENCE OF ERROR IN 250 SOCIAL LETTERS WITH A TOTAL OF 90,530 WORDS

(106 *Unclassified Errors Not Included in this Table.*)

Error-Types	Number of Errors	Rank
I. Punctuation	889	1
II. Sentence Structure	517	2
III. Spelling	308	3
IV. Adjectives and Adverbs	269	4
V. Letter Form	223	5
VI. Capitalization	131	6
VII. Diction	97	7
VIII. Apostrophe	88	8
IX. Careless Writing	61	9
X. Verbs	59	10
XI. Prepositions and Conjunctions	47	11
XII. Case	25	12
XIII. Pronouns (not case)	22	13
XIV. Quotation Marks	9	14
Total	2745	

[9] See Johnson, Roy Ivan. "The persistency of errors in English composition," *The School Review*, 25:555 ff, October, 1917.

errors in student letters. Table II shows the error-types arranged in decreasing order of prevalence. (The table does not include 62 unclassified errors.)

TABLE II. THE RELATIVE PREVALENCE OF ERROR IN 750 BUSINESS LETTERS WITH A TOTAL OF 60,610 WORDS

Error-Types	Number of Errors	Rank
Punctuation	2242	1
Letter Form	402	2
Capitalization	273	3
Sentence Structure	263	4
Spelling	242	5
Verbs	222	6
Apostrophe	80	7
Diction	56	8
Careless Writing	53	9
Prepositions and Conjunctions	47	10
Adjectives and Adverbs	28	11
Quotation Marks	10	12
Pronouns (not case)	9	13
Case	7	14
Total	3934	

Examination of Tables I and II will show the following facts: (1) errors in punctuation constitute 45 percent of the total error; (2) the frequency of error in the business letters is approximately twice as great as in the social letters; (3) the category of error showing the greatest difference in rank in the two sets of material is "adjectives and adverbs."

The unusually large amount of punctuation error is partly explained by the determinative nature of the subject matter. Letter-headings, containing abbreviations, offer tempting opportunities for careless punctuation.

A possible explanation of the greater frequency of error in the business letters lies in the fact that there was a higher degree of selection in the social letters. Nearly all the business letters were written by girls who had *not* entered college—many of them never continued their training further than the completion of the high school—whereas the great majority of the social letters were written by students who had already entered upon their

college course. Granting that the transition from school to college is automatically a selective process, *some* decrease in the frequency of error would be expected. The excessive amount of error in the business letters may also indicate a tendency toward carelessness in the composition of that type of letter. This conclusion is strenghtened by the fact that handwriting was much poorer in the business letters than in the social letters and that little attention was paid to the general neatness of the letter or to the kinds of stationery or writing materials used.

The colloquial nature of the social letter probably accounts for the drop in rank from *fourth* in Table I to *eleventh* in Table II of erroneous usage of adjectives and adverbs. "I sure want you to write" and "We had a real nice time" are expressions more likely to be called out in social correspondence than in formal business letters where there is less occasion for adverbial and adjectival emphasis.

In order to test the reliability of the data and determine the degree of general diffusion of error throughout the letters (i. e., regular recurrence of error-types) the social letters were divided into groups of approximately 18,000 words each and the frequency of error in each group was tabulated. In order to show the degree of constancy with which the error-types persist throughout the five samples, a table of ranks was prepared.

TABLE III. RANK OF ERROR-TYPES IN FIVE SAMPLES OF 18,000 WORDS EACH

Error-Types (from Table I)	Rank in 90,000 words	Rank in five divisional samples				
		1	2	3	4	5
I	1	1	1	1	1	1
II	2	2	2	2	2	2
III	3	3	3	4	4	4
IV	4	8	5	5	3	3
V	5	4	4	3	6	5
VI	6	5	6	9	5	9
VII	7	6	7	6	12	7
VIII	8	7	10	7	7	6
IX	9	9	14	8	9	10
X	10	11	9	10	8	8
XI	11	10	8	11	10	12
XII	12	14	11	12	11	11
XIII	13	12	12	13	13	13
XIV	14	13	13	14	14	14

By applying the formula for rank correlation to the data contained in Table III, correlation coefficients were obtained as shown in Table IV.

TABLE IV. CORRELATION OF RANKS OF ERROR-TYPES IN 90,000 WORDS WITH RANKS IN FIVE DIVISIONAL SAMPLES OF 18,000 WORDS EACH

Samples	Correlation
1	0.94
2	0.90
3	0.96
4	0.92
5	0.95

From Tables III and IV it appears to be a justifiable conclusion that the different types of composition error distribute themselves in approximately the same manner in small bodies of written material (about 50-pupil samples) as in large bodies of material (250-pupil samples). This proves the reliability of the present data so far as mechanical error is concerned and indicates the possibility of reducing the tabulation labor involved in other composition studies.

In regard to content.—When the social letters were examined from the standpoint of content and general style instead of from the standpoint of mechanical correctness, five obvious weaknesses appeared. In each case the characteristics of excellence established by a study of the letters submitted by prominent women (Group I) and of literary letters (Group II) have been used as a standard of judgment. It was not possible, however, to draw reliable conclusions in regard to courtesy in student letters. While there were few noticeable instances of *discourtesy* recognizable, the majority of the letters *seemed* to lack that thoughtfulness and consideration for the reader which was so obvious in the letters of Group I. A too frequent focusing on self (quite natural and excusable in youth) seemed to exclude too completely a consciousness of the interests of the "other person" and leave them at best only a peripheral margin of attention.

Of optimism there was no lack. The objection, if any, would be the seeming perversion of a healthful cheerfulness into an unballasted hilarity—a superlative gush—innocent of all adequate consideration of fact and circumstance.

Crudeness in letter-writing is the miscarriage of informality. The use of a slangy phrase that offends the sense of propriety, the continuous use of beheaded sentences, the excessive use of nicknames and familiar epithets, the hilarious and unrestrained treatment of personal experience, and over-indulgence in the "emotional superlative," may spring from a misdirected attempt to achieve informality in letter-writing—and there can be no doubt that informality is the result—but it is an informality not pleasing to a discriminating mind. This is the first notable weakness of student letters. Evidently the cure lies in the development of good taste, a sense of fitness, and in the careful study and application of the common devices of informality used by good letter-writers.

Inferior humor was evident in most of the student letters in which humor was attempted. The two most prevalent humor devices employed were: (1) interpolated laughter, and (2) the comedy of "tragic" occurrences such as the failure of recipes or of attempts to foil the teacher. Many of these instances really contained humor possibilities which were ruined in the telling. Interpolated laughter is, of course, inane and intolerable. A few rare instances of it can be found in literary letters which are otherwise unobjectionable. The improvement of the quality of humor employed in student composition can be accomplished through more definite attention to the subject of humor. A sense of humor needs educational direction as much as the capacity for musical appreciation.

Few opinions, other than exclamatory outbursts indicating approval or disapproval, were found in the student letters. Actual count showed fewer than ten percent of them to be opinionative. They were primarily "newsy," a complete gossip repertory, a catalogue of "she-did's" and "we-went's."

Lack of organization about central themes was another prominent weakness of the student letters. Instead of few centers of organization, there were many. The tendency to "tell everything" is probably a natural juvenile trait, since everything in one's experience is invested with a certain interest; but it is contrary to the best practice as found in the letters of Groups I and II. The value of *dominant themes* in letters should be stressed.

Violations of good form include poor paragraphing and improper headings and conclusions. Approximately one half the errors in form which were found in the student letters were errors in paragraphing. In listing improper headings and conclusions a wide latitude of usage was allowed. Strictly speaking, the matter of form should not be included in this list of weaknesses, since it is *not* a matter of content. But since paragraphing is so intimately related to the manipulation of the subject matter and is determined directly by the nature of the content, it is included here even at the risk of seeming illogical.

Summary

There may be other characteristics of a good letter than those which have been pointed out in this study, but the importance of the study lies in the fact that it establishes (by careful analysis rather than by mere opinion or guess) certain very clear objectives to be used in a course in letter-writing. It also records certain devices or means by which successful letter-writers have attained the objectives of courtesy, informality, humor, etc.

The analysis of student letters lends new confirmation to the belief that emphasis upon mechanical correctness is a primary need in student composition. It also shows the greatest weaknesses of student letters (so far as actual content is concerned) to lie in crude attempts at informality and humor and an excessive newsiness which expresses itself in "an abundance of detail without organization."

This study in no way minimizes the element of personality in letter-writing. In accepting the objectives which the study establishes, one is not "reducing personality to mathematics."

There must be a technique of every art, and letter-writing is no exception.

Having particularized the objectives of letter-writing, one naturally seeks the means of attainment. There arises, then, the need of a body of subject matter, based on the results of the present study or of similar studies and organized for use in the school course in composition. Not only is such a procedure possible in letter-writing, but it is possible also to study every other unit of functional composition and to determine scientifically the nature of the subject matter necessary to the development of proficiency in the specific task to be mastered.

DETERMINING CHRONOLOGICAL AGE IN DECIMAL PARTS OF A YEAR

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In the determination of age norms of tests, it is very desirable to take accurate account of the subjects' ages. Chapman[1] has recently called attention to this important matter. Inaccuracies in age determination may be largely avoided by asking the following three questions on the questionnaire filled out by each child:

1. In what year, month, and day *were you born?*

.....
(*Year*) (*Month*) (*Day of Month*)

2. How old were you at your LAST birthday?.....
(*Years old*)

3. What was the date of your LAST birthday?

.....
(*Year*) (*Month*) (*Day of Month*)

It will be seen that the answer to 3 minus the answer to 2 should be exactly the answer to 1. Where all three of these do not check, personal inquiry of parents may elicit the required information.

Having presumably accurately determined the answer to question 1, it is still necessary to determine the exact age of the subject *upon the given test date* in order to place him in the proper fractional year-group for the determination of norms. This is readily accomplished by means of the accompanying table, made up on the assumption of 365 days in the year, so that 1 day = 0.0027397 years. By subtraction of any two entries of this table, the true interval of time elapsing between the two dates of the entries is found, correct to the one-thousandth part of the year. The table is made out for 12:01 A.M. of the dates indicated; so that for the additional fractional parts of a day

[1] Chapman, J. C. "Some elementary statistical considerations in educational measurements." *Journal of Educational Research*, 4: 212-220, October, 1921.

one must add the corresponding fractional part of 0.0027397 to the interval found for corresponding clock times of the two days under consideration. The use of the table will be amply illustrated by the two examples:[2]

Example 1. Required the fractional part of a year between the birth date December 10, 1909, and the test date May 3, 1920. Under May 3 we find the entry, 0.334; under December 10 we find 0.940. We are now ready to subtract, thus obtaining the difference of 10.394 years.

$$\begin{array}{r} 1920.334 \\ 1909.940 \\ \hline \text{Difference} = 10.394 \text{ years} \end{array}$$

A calculating machine is very efficient in obtaining chronological ages. The 1920.334 is a constant and may be left in the machine all the time, merely altering the keyboard to suit the subtrahend.

Example 2. In vocational tests, it is often desirable to get comparative measures of workers' production at a stated interval of time after entrance upon the job. This general problem may be accomplished by the table, although a calendar giving the ordinal numbers of all days in the year may be handier where small intervals of time are concerned.

Required to know on what dates A, B, C, respectively, will have been on the job just 10 weeks.

10 weeks = 70 days. In the table 1 day = 0.0027397; whence, 70 days = 0.192 yr.

	a Date Entered Job	b Year and Decimal	c Col. b + 0.192	d Dates on Which to Begin Count of Production
A	1–19–1919	1919.049	1919.241	March 30, 1919
B	3–15–1920	1920.200	1920.392	May 24, 1920
C	10–24–1918	1918.811	1919.003	January 2, 1919

We simply add 0.192 year to the entering date, expressed as a decimal (Col. b), and look up the resulting sum (Col. c) in the table, giving the dates of Col. d, which are the dates of the beginning of the eleventh week on the job.

NOTE: In Example 1, if the extra day of a leap year in February is included, allowance may be made by *adding* 0.003 year. In Example 2, in the same situation, one day should be *subtracted* from the date of Col. d.

[2] Since writing this article it has come to the attention of the author that the Monroe Calculating Machine Company has published a table for determining the interval between interest dates, based upon the time at 12:00 P.M. In order to avoid possible copyright infringement, the present chart is published with the permission of the Monroe Calculating Machine Company.

TABLE I. FOR DETERMINING TIME INTERVALS IN DECIMAL PARTS OF A YEAR

(1 day = 0.0027397 years)

	1	2	3	4	5	6	7	8	9	10	11	12	
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
1	.000	.085	.162	.247	.329	.414	.496	.581	.666	.748	.833	.915	1
2	.003	.088	.164	.249	.332	.416	.499	.584	.668	.751	.836	.918	2
3	.005	.090	.167	.252	.334	.419	.501	.586	.671	.753	.838	.921	3
4	.008	.093	.170	.255	.337	.422	.504	.589	.674	.756	.841	.923	4
5	.011	.096	.173	.258	.340	.425	.507	.592	.677	.759	.844	.926	5
6	.014	.099	.175	.260	.342	.427	.510	.595	.679	.762	.847	.929	6
7	.016	.101	.178	.263	.345	.430	.512	.597	.682	.764	.849	.931	7
8	.019	.104	.181	.266	.348	.433	.515	.600	.685	.767	.852	.934	8
9	.022	.107	.184	.268	.351	.436	.518	.603	.688	.770	.855	.937	9
10	.025	.110	.186	.271	.353	.438	.521	.605	.690	.773	.858	.940	10
11	.027	.112	.189	.274	.356	.441	.523	.608	.693	.775	.860	.942	11
12	.030	.115	.192	.277	.359	.444	.526	.611	.696	.778	.863	.945	12
13	.033	.118	.195	.279	.362	.447	.529	.614	.699	.781	.866	.948	13
14	.036	.121	.197	.282	.364	.449	.532	.616	.701	.784	.868	.951	14
15	.038	.123	.200	.285	.367	.452	.534	.619	.704	.786	.871	.953	15
16	.041	.126	.203	.288	.370	.455	.537	.622	.707	.789	.874	.956	16
17	.044	.129	.205	.290	.373	.458	.540	.625	.710	.792	.877	.959	17
18	.047	.132	.208	.293	.375	.460	.542	.627	.712	.795	.879	.962	18
19	.049	.134	.211	.296	.378	.463	.545	.630	.715	.797	.882	.964	19
20	.052	.137	.214	.299	.381	.466	.548	.633	.718	.800	.885	.967	20
21	.055	.140	.216	.301	.384	.468	.551	.636	.721	.803	.888	.970	21
22	.058	.142	.219	.304	.386	.471	.553	.638	.723	.805	.890	.973	22
23	.060	.145	.222	.307	.389	.474	.556	.641	.726	.808	.893	.975	23
24	.063	.148	.225	.310	.392	.477	.559	.644	.729	.811	.896	.978	24
25	.066	.151	.227	.312	.395	.479	.562	.647	.731	.814	.899	.981	25
26	.068	.153	.230	.315	.397	.482	.564	.649	.734	.816	.901	.984	26
27	.071	.156	.233	.318	.400	.485	.567	.652	.737	.819	.904	.986	27
28	.074	.159	.236	.321	.403	.488	.570	.655	.740	.822	.907	.989	28
29	.077	....	.238	.323	.405	.490	.573	.658	.742	.825	.910	.992	29
30	.079	....	.241	.326	.408	.493	.575	.660	.745	.827	.912	.995	30
31	.082	....	.244	....	.411	....	.578	.663	....	.830	....	.997	31
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	

Editorials

THE MENTAL AGE OF ADULTS

When an important weekly journal devotes one of its main articles to the subject of the mental age of adults[1] we may fairly say that it is no longer a merely academic question. We may be pleased that our problems appear to non-technical observers to be important, but we are not flattered when a non-technically trained writer is assigned the task of instructing the public in a matter which one might suppose would require somewhat special knowledge for its adequate treatment. It must be admitted in the present case, however, that the non-technical student has put his finger on some aspects of the question which have been overlooked by our colleagues in psychology. While he supports his conclusion in a very vague and incomplete way, his main contention is correct. This may be shown by reviewing the arguments in the case.

The whole controversy started with the official report of the army mental examinations, in which we read: "It appears that the intelligence of the principal sample of the white draft, when transmuted from Alpha and Beta Examinations into terms of mental age, is about 13 years (13.08)."[2] The conflict between this estimate and Terman's former estimate of 16 years, which had been pretty generally accepted, is discussed as follows: "For norms of adult intelligence the results of the Army examinations are undoubtedly the most representative. It is customary to say that the mental age of the average adult is about 16 years. This figure is based, however, upon examinations of only 62 persons,

[1] Lippmann, Walter, "The mental age of adults." *New Republic*, 22:213, October 25, 1922.

[2] Yerkes, Robert M. (editor) *Psychological examining in the United States Army.* (Memoirs of National Academy of Science, Vol. 15) Washington, D. C.: Government Printing Office, 1921. p. 785.

32 of them high-school pupils from 16 to 20 years of age, and 30 of them 'business men of moderate success and of very limited educational advantages.' This group is too small to give very reliable results and is furthermore probably not typical."

Curiously enough Mr. Lippmann draws exactly the opposite conclusion from this discrepancy in results and difference in number of cases from that which is drawn by the writer of the army report. The latter holds that, because of the preponderance of evidence, the army figures may be taken as clear evidence that the average adult intelligence is a little over 13 years. Mr. Lippmann, on the other hand, points to the general fact that "the average of the army did not at all agree with the average of Mr. Terman's Californians" and that since this is so, and the army scores are based on so many more cases, the army tests have "knocked the Stanford-Binet measure of intelligence into a cocked hat."

Just how the army tests have discredited the Stanford-Binet norms we are not told except in vague phrases. The issue would seem to be this. Those who accept the adult norm of 13+ years regard the Stanford-Binet scale of norms as valid and then express the army median score in terms of these norms by a translation of Alpha and Beta scores into them. Mr. Lippmann's point would seem to be that this procedure contains a flat contradiction. If you accept the finding that the average adult has a mental age of 13+ years you cannot at the same time hold that the mental age of the average adult is 16 years — which is involved in the acceptance of the Stanford-Binet scale of norms. The Stanford-Binet scale must therefore be abandoned, since it was derived from so much the smaller number of cases. To use Mr. Lippmann's picturesque phrase, "it is knocked into a cocked hat."

There seems indeed to be much merit in this contention. How can we at the same time use the scale for the interpretation of the mental age of adults and deny its validity by adopting a mental-age standard which is at variance with it by three years? We cannot. That is plain.

But pause a moment. Are we then to consider the whole Stanford-Binet scale of norms as seriously in error? Surely that would not be justified by our widespread experience with it. Its essential correctness is certified not merely by the thousand or so children upon whom it was standardized but by the thousands who have been tested by it since it was standardized. If the whole scale is not in error, just where does it begin to be in error, at the age of 15, or 14? If it is correct up to 14 and in error by three years at 16 how does it happen that the tremendous gap in difficulty does not throw out the scores of children of 13 and 14?

There is a much clearer solution which avoids this dilemma. The median mental age of recruits was estimated by giving six hundred odd men both the Army Alpha test and the Stanford-Binet scale. From a comparison of scores a table of equivalent scores in the two tests was worked out. By means of this table the median mental age of recruits was calculated. *This procedure assumes that a test standardized with children will give equivalent scores with adults.* It assumes that the average man, who has been out of school for from five to ten years, who has done very little reading and has been provided very meager intellectual stimulus, will do as well on a test standardized on school children as he would have done while he was in school. There is good reason to believe that he would not do as well. The character and amount of schooling influence the score in mental tests. Lapse of schooling, therefore, must influence it.

The dilemma into which we are forced by this customary assumption that scores of adults can be translated into mental-age norms by means of tests standardized on children is obvious when we attempt to estimate the proportion of mentally defective persons. Terman has calculated that 2.3 + percent of children have an I.Q. of 75. This means that their ultimate mental age is 12 or below. Using the mental-age equivalents of the army scores, however, we arrive at 30 + percent as the percent of adults whose mental age is 12 or below. Are we to suppose that 27.7 percent have *become defective* between school age and

manhood? Surely not. Yet there is no escape from this absurd conclusion if we grant the validity of the Stanford-Binet scale and of the translation method above mentioned.

The simplest way to put the question "What is the mental age of adults?" is "When do individuals cease to grow intellectually?" The best evidence that I have seen on this point is that mental growth, as measured by a mental-test score, continues well beyond 13 years of age, and probably beyond 16 years. This evidence consists of repeated measurements on the same individuals. Such measurements constitute the only thoroughly reliable evidence on the question.

Let us be clear on the main fact. Intellectual growth does not cease at 13 years and the adult does not possess the inherent intellectual limitations of the thirteen-year-old child. The attempt to make tests show that adult mentality is 13 gets us into contradictions. The extravagant applications which have been made of this supposed discovery are enough in themselves to make us sceptical of it. The error has become so widely diffused that it has become a matter of importance for us to take some pains to correct it.

F. N. F.

THE DIFFICULTY OF TEXTBOOKS

It is clear that the ability of children to read their textbook definitely conditions the value of the book. Many other characteristics must be considered in the selection of a textbook, but none of them is effective unless the book can be understood.

The appearance of Franzen and Knight's "Textbook Selection"[1] and their use of the difficulty criterion prompt us to comment appreciatively upon the value of their data. Our studies of the product of teaching have proceeded far enough so that we can state the reading ability of children in each grade. Moreover, we can do so in units which have the same meaning when applied to reading material. By bringing together the two ideas —namely the ability of the children of a given grade and the difficulty of the textbook placed in their hands—Messrs. Franzen

[1] Baltimore: Warwick and York, 1922. 94 pp.

and Knight are able to make some interesting statements concerning the difficulty of geography texts. For example, it is found that five-sixths of the material in the typical first geography book—the book usually begun in grade IV—is too hard for the pupils of that grade to understand. It is also stated that only about one-half of the second book of the usual two-book series, can be understood by the children of grade VI—the grade in which it is first introduced.

Observant teachers have for a long time noted the discrepancy between the reading ability required by textbooks and the reading ability actually possessed by pupils. Vocabulary, style, and organization of textbooks have been such that they have not reached their proper reading public, namely, the children. These writers by experiment have confirmed this belief regarding geographies. There is every reason to believe that similar findings would be obtained with respect to textbooks in history, literature, general science, and arithmetic. The method of the investigation is simple and direct. It proceeds upon the sufficient basis of the selection of passages from the book under consideration and the formulation of questions on each passage. Certain precautions are of course to be used in making up the passages and questions. The real point, however, is that our statistical analyses—those despised meanderings of the theorists—have placed us in a position where we can work simply, directly, and conclusively to a determination which everybody can understand. A geography five-sixths of whose material cannot be understood is a tangible, as well as a disconcerting, piece of pedagogical luggage.

Either or both of two courses are open to us. The geographies—and inferentially the histories, arithmetics, and science books—must be made simpler. On the other hand, children must be taught to read better. It is becoming everywhere apparent that our emphasis upon oral reading has lead our pupils into a cul-de-sac. Children so taught have no outlet from the situation in which they find themselves except failure; and failure is scarcely an outlet. As we learn more about the teaching of

silent reading it becomes clear that here lies the greatest hope of improvement in instruction. In experimental groups, children have shown such remarkable improvement both in rate and in comprehension of reading as to justify us in believing that a general advance in standards is possible.

But at the same time, the textbooks must be made simpler, not only that the discrepancy between them and the pupils' ability may be directly diminished, but also because by their very difficulties they are preventing that improvement in silent reading upon which the understanding of them, either in their present or in their simpler form, depends.

We confess to a certain degree of impatience because in this study of geography textbooks the names of the books have been suppressed. The authors of the study state that these titles have been deleted "for obvious reasons." The reasons may be obvious, but they do not seem to us to be conclusive. The practical value of so excellent a study is only to be secured when its findings are put into practise. Unless the superintendent or textbook committee is expected to do this sort of work all over again, the findings should be given without resort to a code number for each publication. Any piece of unprejudiced scientific inquiry into the merits of textbooks ought to be and we believe will be strengthened by a fearless presentation of its findings. In other words, the "obvious" reasons are neither sufficient nor especially obvious.

B. R. B.

Reviews and Abstracts

FRANZEN, R. H. and KNIGHT, F. B. *Textbook selection.* Baltimore: Warwick and York, 1922. 94 pp.

Five major criteria to be considered in selecting any text are given by the authors: interest, comprehension, the permanent methods of study involved in the text, the permanent values of the content, and the mechanical construction of the book. These criteria are difficult of application to any given problem; generalizations in the way of principles usually offer less difficulty as such than when the attempt is made to apply them to specific concrete situations. The purpose of the book is stated as follows: "First, to state the fundamental propositions which must underlie sound practice of textbook construction; second, to give two researches which are at least moderately successful attempts at such application."

The first study has to do with the criterion of interest as applied to high-school texts in literature. It has two distinct values. It gives a method generally applicable to the collection of data concerning interest. It also establishes on the basis of interest (1) a "Preferred List" of books that should receive first consideration in high-school courses in English literature, (2) a "Second Preferred List" which should receive second attention, (3) a "Substitute List" from which some selections may be made, and (4) a "Free Reading List" that might more appropriately be termed a "Black List," being a list of books which should never be used as texts in the high school. It will no doubt come as a distinct shock to many that "Paradise Lost," "Heroes and Hero Worship," "Vision of Sir Launfal," and many others equally familiar should be among those relegated to the "Free Reading List."

One of the striking facts brought out in this study is that there is no relation between the interest which pupils find in books and the frequency with which the books are adopted and used.

The second study applies the criterion of comprehension to geography textbooks in use in elementary schools. Reading tests were constructed from the textual material of five series of geographies. The results obtained from giving these tests to about 700 pupils gave an accurate and serviceable index of the comprehension difficulty of each book. These figures were compared with the norms of reading ability (comprehension) of school children. The difficulty of each book was then expressed in terms of the age and grade of children who could read them understandingly. In general, the books were found to be too hard for the pupils of the grades in which they are customarily introduced. Important differences, however, occurred among the books designed for use in the same grades.

Obviously, a textbook in geography, history, general science, or what not, is useful only to the extent to which it falls within the reading ability of the

group for which it is intended. If the text is too difficult from this standpoint, the teacher will find herself teaching not *bona fide* subject matter of the kind in question, but reading.

It is unfortunate that the commercial aspects of the situation forbade the publication of the names of the geography texts investigated. Most school men would be very anxious to use the results of this study in selecting texts. As it is, the study is valuable in giving a general technique for choosing texts, although it falls short of its greatest usefulness through its failure to specify the books to which its findings refer.

The professionally minded school man or school woman should find this book challenging, suggestive, and helpful. The results of the first study are highly interesting and of very immediate practical value for the teacher of high-school English. Both studies are important in that they give a general method for further research.

HERMANN REMMERS

Colorado College

GRANT, JAMES R. *Acquiring skill in teaching.* New York: Silver, Burdett and Company, 1922. 222 pp.

One of the more difficult problems which confronts the superintendent or principal, especially if he is new at the game, is that of planning the work of teachers' meetings, reading circles, parent-teacher association meetings, and other such improvement-in-service work so that some real good may be accomplished. Furthermore, the teacher herself, if she is a good teacher, feels the need of a definite plan of study. It is to help fill this need that Mr. Grant has prepared this book. It should serve as a guide to the reading, thinking, and practice of teachers and supervisors.

The book is divided into five major headings under each of which there are a number of sub-topics. Each sub-topic is broad enough to allow for as much discussion and study as any group (or individual teacher) would find desirable for a single lesson. It includes a brief discussion by the author of the aim of the lesson with methods of study followed by a list of statements a propos of the topic, some axiomatic, some rather questionable. The group (or teacher) is to discuss the statements and to conclude in the light of modern educational thought why each of them is true or false. Following each topic or group of topics, is a list of suggested references to educational works, with the exact citation in each case. If the book had no other value, these lists of selected references would establish its importance.

If there is any criticism to offer, it is that the trend of thought throughout the text is definitely toward the rural school to the exclusion of urban and village problems. However there are a number of sections of a general nature. Moreover, so many rural problems are also urban that the book is valuable to all teachers. Ideas are not cut and dried for the teacher to take whole as pills for the cure of her pedagogical ills. They are rather suggestions for thought to be worked out and made a part of her own ideals and purposes in teaching.

DWIGHT H. STEVENSON

Ohio State University

BOOK, WILLIAM F., *The intelligence of high school seniors.* New York: The Macmillan Company, 1922. 355 pp.

In "The Intelligence of High School Seniors" Professor Book tells of his state-wide mental survey of high-school seniors in Indiana. His chief aim was "to locate by means of reliable intelligence tests the ablest students graduating from the high schools of the state during the year, and to suggest means whereby they might be definitely encouraged to attend college and, if need be, aided financially so that they might continue their education beyond the high-school stage." The study shows the relation of intelligence of Indiana seniors to school success, selection of high-school course, favorite study, college and vocational intention, economic status, and to size and locality of high school. It also discusses sex differences. The Indiana University Intelligence Scale, Schedule D, was the measure used and approximately 6,000 students were tested.

The report is one of the most interesting of the year, for it is only by means of such comprehensive surveys that we can discover the real facts upon which to base our educational procedure. The author deserves high praise not only for the method and scope of his study but also for the emphasis placed upon the necessity for conserving the best brains of our student body. It is indeed important for society that the highest intelligence be directed into the most productive channels.

To give some idea of the significance of the investigation the following findings and conclusions may be cited: (1) Seniors of all grades of mental ability express their intention of going to college; many of the brightest are not planning to go, while many of the dullest have already selected their prospective colleges. (2) The high schools are not accelerating as many students as the intelligence tests indicate they should, and the brightest seniors in the total list were never selected for acceleration either by the high school or in the elementary grades. (3) The high schools seem better adapted to the interests and needs of the girls, for though the boys as a group rank higher in the tests, the girls have been more rapidly promoted, and more boys than girls have been retarded. (4) Intelligence scores are poor criteria for predicting school success in individual cases. (5) The fact that only sixteen different lines of work were chosen by the 4,000 or more students who had selected their life vocation, and that these vocations were often ill-adapted to the student's mental power, indicates a need for better educational and vocational guidance. (6) The high schools do not draw from all classes of society equally. (7) The marked differences in intellectual capacity that often exists between senior classes of different schools, cities, and sections of the state should be considered in judging school achievement.

The main part of the book is taken up with a simple, clear presentation of findings, which is made more effective by a copious supply of graphs and plenty of concise summaries. The chapter on "sex differences" seems rather unnecessary, however, for it is almost entirely a repetition of material contained in preceding chapters. Perhaps we feel, too, that our attention should have been earlier called to the fact that since there were actually a third more girls than boys, "the most probable explanation that can be offered for the

marked superiority of the boys, taken as a group, is that many boys of the more inferior ability dropped out of school before reaching senior standing in high school, while more girls with inferior intelligence remained to complete their high-school course." There is no mention at all of the more obvious fact that the adolescent girl is handicapped in certain respects. Fewer contacts with the world than has the boy, less opportunity to develop sure and ready response to new situations and to gain some types of practical knowledge, and especially, a tendency to become "flustered" under test conditions, all these help to keep the adolescent girl's test score lower than her masculine classmate's.

The pertinent discussions and remedial suggestions of the four concluding chapters will give the school man some food for thought and probably a desire to put to test, in other states, the validity of Book's conclusions. He emphasizes the need for a knowledge of the intellectual caliber of our youthful population in order to conserve all human capacities and talents, and points out particularly the value of cooperative research.

DOROTHY HAZELTINE YATES

San Jose State Teachers College

BUTTERWORTH, JULIAN E. *Rural school survey of New York State.* Ithaca, New York: Joint Committee on Rural Schools. 1922. 131 pp.

This survey deals with the condition of school buildings in rural communities. In addition to presenting a body of suggestive facts Dr. Butterworth has developed a score card for rating small school buildings and has given suggestions for improving existing conditions.

The score card divides possible building standards into two groups which Dr. Butterworth describes as "essential" and "additional." The former should be required of all; and the latter of those that are in advance of what may be expected in most schools.

In justifying this procedure the author says: "It better meets the farmer's state of mind in that he is less likely to think it involves impracticable standards. . . . A satisfactory score implies that those factors essential to accomplishing the purposes of a rural building are all included and that no other factors may be substituted. A playroom cannot be substituted for a pure water supply nor a telephone for a sufficiently large playground, yet this would be possible where a specified number out of 1,000 points is set as a minimum."

Some of the interesting facts concerning the small schools shown by this survey are as follows. (1) Only 0.35 of one percent of the one-teacher schools had a score of 900 or over while 9.1 percent of the two-teacher schools had a score of 900 or over. (2) Not only is the glass area too small in the majority of schools, but 86 percent of the one-teacher and 70.4 percent of the two-teacher schools have opaque shades that cannot be adjusted. (3) Only 3.4 percent of the one-teacher and 23.3 percent of the two-teacher schools had unilateral lighting. (4) Over 56 percent of the one-teacher and 26.5 percent of the two-teacher schools still use double non-adjustable desks. (5) Only 49.5 percent of the one-teacher and 61.8 percent of the two-teacher schools

have either composition or slate blackboards. (6) There are no means of artificial lighting in 85.7 percent of the one-teacher and 58.7 percent of the two-teacher schools. (7) The median age of one-teacher buildings is 51 years, while 25 percent of them are 66 years or more old.

The survey shows that New York State has not provided satisfactory buildings for its school children. The one-teacher buildings are in the worst condition. The two-teacher buildings are somewhat better but still in need of improvement. In schools of three teachers or over the situation is mixed—satisfactory in some cases, in need of improvement in most, and utterly inadequate in others.

When concluding his suggestions for improvement, Dr. Butterworth says, "lack of more complete success in New York has been due largely to too much dependence on legislation—and on legislation that is inadequate."

This book will offer valuable suggestions to rural educators who wish to make a scientific study of school-building conditions in their respective states or districts.

P. R. STEVENSON

Bureau of Educational Research, Ohio State University

CHARTERS, W. W. *How to sell at retail.* Boston: Houghton Mifflin Company, 1922. 326 pp.

This may be called the adventures of an educator in business. Selling is an art; so, also, is teaching. Certain fundamental methods of successful practise are applicable to either. I should say of this book that its outstanding feature is its concreteness, its helpful detail. It does not assume the principles of salesmanship and proceed to elucidate them; the world is full of books of that sort. They run to the over-elaboration of the obvious; and the reading of them for the well-informed person is a waste of time. Much pedagogical literature of this sort is on the market. We are not so well informed as to its supply in the field of retail selling, but we suspect that the human qualities which lead to its production in the one field operate pretty much to the same end in other fields.

Readers of the JOURNAL OF EDUCATIONAL RESEARCH will recall the exceedingly suggestive articles by Dr. Charters in the April and May, 1922, numbers in which he develops with reference to educational practise his methods of analysis of difficulties and of systematic interviewing of successful practitioners. These are the methods which this book exemplifies. Not that the author talks—except incidentally in the preface—of difficulty analyses or of the training of interviewers and the conduct of interviews. The pedagogy of the book is too artful for that.

The analogy between salesmanship and teaching, though not close, is suggestive. Some of the difficulties which the salesman encounters are strikingly like those encountered by the teacher. But it is not because of any such analogy that we bring this book to the attention of an educational public. It is rather because it exhibits a remarkable product of a method far more widely applicable—applicable especially to various types of service in education.

In retailing it appears that the customer is the center of the activity. Accordingly, much of the difficulty analysis has to do with types of customers. There is the customer who is undecided, tired, silent, or vain. There is the "hooker," the bargain hunter, and the spender. There are those who shop in pairs, for example, the mother-daughter combination and the husband-wife combination. These types of customers present difficulties for the salesman. Accordingly—and here is where the interviews come in—successful salespeople as well as buyers and executives contribute methods of handling each specific situation.

Obviously, the same thing can be done in education. An analysis of the types of children with whom teachers have difficulty, of the parts of the course of study which give trouble, of the equipment or lack of it, of the environmental influences which tend to impede—such an analysis if made the basis of concrete specifics for handling the difficulties would produce for teachers as good a book as this undoubtedly is for salespeople.

B. R. B.

STONE, CLARENCE R. *Silent and oral reading; a practical handbook of methods based on the most recent scientific investigations.* Boston: Houghton Mifflin Company, 1922. 295 pp.

Coming in on the tidal wave of the keen interest awakened by the various scientific investigations into the nature of the reading process in the last decade or two, this new book will prove of service to the teacher, inspector, and superintendent interested in methods for the teaching of reading. It is one of the series of Riverside Textbooks in Education under the general editorship of Cubberly. The subtitle of the book, "A Practical Handbook of Methods Based on the Most Recent Scientific Investigations," describes the chief content of the book. It is not a research contribution but a compendium of methods, types of training, and lesson plans for oral and silent reading, worked out by various investigators. Probably its chief value to the elementary-school teacher or superintendent lies in presenting in accessible form within the covers of a single volume, the manifold contributions of many students.

Eschewing technical terminology, the book is written in simple readable language, thus placing it in the reach of a wide circle of readers. At the end of each chapter a number of questions and problems for study and discussion are listed with a view of increasing its practical usefulness.

The first part of the book is devoted to a presentation of the results of recent research in the psychology and pedagogy of reading. The results of the investigations of Huey, Judd, Gray, Buswell, Courtis, O'Brien, and Starch, are quoted. These serve largely as the foundation upon which is reared the superstructure of the methods and types of training in oral and silent reading.

After giving the reader an insight into the physiological basis of the reading process, the character of eye movements and fixation pauses in various kinds of reading, and the factors affecting rate and comprehension, the book discusses the aims and methods of the teaching of reading in the primary grades. In presenting the relative values of oral and silent reading, the author adopts the sane and happy medium of commending the value of oral

reading in the early primary grades, because of the richer oral vocabulary of the beginner, and because of the favorable reflex influence of fluent oral reading upon silent reading, the cultivation of which will be the teacher's chief concern in the intermediate grades. But even in the primary grades silent reading is not to be neglected but improvement in this vitally important form of reading is to advance *pari passu* with improvement in effective oral reading. The relative emphasis upon oral and silent reading is well placed. It reflects admirably the findings of experimental research and the results of the scrutiny and careful sifting of the values which reading and the other subjects in the curriculum should yield to justify the tenure of their relative share of the pupil's time and effort.

In the teaching of reading in the intermediate grades, the silent interpretation of the printed symbols begins to play a constantly enlarging rôle in the life of the student. Word-pronunciation, articulation, phonics, though still elements of value, must not obscure the imperative necessity of training in rapid, effective silent reading. In actual life the pupil reads a great variety of material for a great variety of purposes. The author wisely points out the wisdom of training the pupil to meet this variety of ends.

Thus the "study" type of reading differs *toto caelo* from the "getting the gist" type; reading for factual information differs widely from reading for literary appreciation. The acquisition of but one uniform method of reading all types of material, heavy and light, for "study" or for "getting the gist" purposes, and the crystallization of that type of reading into a fixed inflexible habit, constitutes one of the minor tragedies in the life of most individuals. In the past, the school has taken little or no cognizance of the great variety of purposes for which reading is done outside the classroom. As a consequence there has been little or no conscious effort made by the school to equip the student with different types of habits suited to the variety of purposes for which one actually reads. The author's recognition of this fact, and the discussion of the technique of training for different types of reading is calculated to overcome this deficiency in the conventional teaching and to meet in a measure this keenly felt human need.

A large—in the reviewer's opinion, a disproportionately large—part of the book consists of copious quotations from reading primers, primary method textbooks and manuals, giving samples of material, lesson plans for oral and silent reading in individual and group arrangement. It is difficult for a book to seek to exhaust all the types of reading material, and lesson plans offered by a formidable array of primary readers and teachers' manuals without impairing its unity and suffering from a sort of sketchiness. Because of this, and because of repetitions of the same ideas in several chapters, the interest wanes at times.

The book covers a wide field, gathers treasures from many sources, presents them in simple readable language and reflects with fidelity the relative stresses and the types of training which flow from modern scientific research in the psychology and pedagogy of reading. Mr. Stone's manual should prove of value to a wide circle of teachers in enabling them to render their teaching of reading, both oral and silent, more fruitful and effective.

The Columbus Foundation, University of Illinois JOHN A. O'BRIEN

News Items and Communications

This department will contain news items regarding research workers and their activities. It will also serve as a clearing house for more formal communications on similar topics, preferably of not more than five hundred words. These communications will be printed over the signatures of the authors. Address all correspondence concerning this department to Doctor E. J. Ashbaugh, Ohio State University, Columbus, Ohio.

Teachers College, Columbia University, announces an enrollment this year in all departments of over 3,800. More than 1,000 of these are graduate students attending the School of Education.

The New York Society for the Experimental Study of Education with an appropriation from the Commonwealth Fund, is working on the following projects during the current year: (1) intelligence tests applicable to children of pre-primary age; (2) silent reading of high-school pupils; and (3) measurement of attainment in French.

The West Virginia State Education Association is issuing a series of mimeographed bulletins for the benefit of the schools of the state. The bulletins are brief, well written, and concise. Much credit for them should be given to the secretary, Mr. W. W. Trent of Elkins. If these bulletins reach the educational, political, and industrial leaders of the state, much good is doubtless being accomplished for the general cause of education.

Superintendent W. H. Holmes of Mount Vernon, New York, prefers classes of thirty-five to forty pupils to those of twenty-five because he believes that they produce a better *esprit de corps* than a smaller group. He advocates individual instruction and states that it is quite as feasible in the larger classes as in the smaller.

The following paragraph from an editorial in a daily paper attracted our attention because of the brief and forceful way in which the value of an education was presented: "The man without any formal education can get ahead in certain rare cases. But a man endowed with brains and ability who has added to them education is more in demand today than ever before. His opportunities make for personal success as well as for service to mankind by his special training."

As we get farther from the period of the war, the frequency and intensity of the utilization of the public schools for drives and campaigns may well

be expected to lessen. And yet, it is quite evident that external agencies have not forgotten what was learned during the war period. The ease with which the schools can be used for various purposes makes them still the chief means which suggests itself to the minds of those who have a special object to attain or propaganda to disseminate. Fire Prevention Week, October 2-9; Safety Week, October 8-14; and American Education Week, December 3-9, will be illustrative of the facts set forth above and have been the cause of this comment.

The bulletin entitled "Survey of the Department of Instruction" issued by the board of education of Cleveland, Ohio, presents the report of the superintendent of schools. It contains, for the most part in graphical form, a large amount of information on school statistics for the year 1920-21. Those interested in securing comparable data on enrollment, promotions, and failures, achievement on various standard tests, per pupil cost, etc., will find it to their advantage to secure this report from the Cleveland schools.

The increased number of school papers issued by boards of education for the dissemination of news about the schools is most gratifying. The more nearly a board of education can keep its community completely informed on policies and progress, the more nearly may they expect united support on the part of the public. The October 4th number of the *School Herald* of Akron, Ohio, contains an admirable summary of the administrative and supervisory service of the schools of that city. The duties and responsibilities of the officers who perform this service are set forth in a manner which can be clearly understood by anyone who can read. School boards owe this service to their constituencies.

The Bureau of Educational Research of Teachers College, University of Nebraska, under the directorship of Doctor Charles Fordyce announces activity this year in directing superintendents in that state in making critical studies of their local school systems. A distributing center for standardized tests in the state has been established at the university, and more extensive service is to be rendered.

Miss Edna Gordon, school psychologist for the village of Shaker Heights, a suburb of Cleveland, Ohio, reports that the research problem there this year will be largely individual case problems. Individual remedial instruction on the basis of results revealed by standardized tests, together with improvement in curriculum and method, will be attempted.

The Ohio State Director of Education has called a conference at Columbus of normal-school directors and county school superintendents to consider raising the qualifications of Ohio's public school teachers. Surprisingly low grades have been made in elementary subjects by prospective teachers in the fifty-six county normal schools. It is considered desirable that those of the 1,600 normal-school students who are showing few signs of becoming compe-

tent instructors be told so and directed to seek occupational opportunities in some other field.

Teachers College, Columbia University, has raised its entrance requirements for admission to its School of Practical Arts by discontinuing freshmen and sophomore instruction. Henceforth this school, which trains teachers in home economics, fine arts, music, nursing, and allied subjects, will limit its work to juniors, seniors, and graduates. The action was made necessary by the astonishingly rapid growth in enrollment during the past few years.

Several attempts to establish definite minimum standards in English have come to our attention recently. Standard usage in English by the English Department, University of Chicago High School, is the most extensive, while those adopted by the teachers of the Richmond Hill High School, New York, are especially pleasing in their conciseness. We are sure that such attempts at clearness of definition make for increased efficiency on the part of both teacher and pupil. When children know definitely what standards are expected, they have less tendency to do inferior work. In other words, definiteness of situation enables children as well as teachers to criticize their work.

The proceedings of the ninth conference on educational measurements at Indiana University has recently been issued. Like its predecessors, it is full of real scientific material interesting alike from the standpoint of advanced educational thought and records of experimental activity. Dr. H. H. Goddard, then Director of the Ohio Bureau of Juvenile Research (now professor of psychology at Ohio State University), and Dean W. S. Gray of the School of Education, University of Chicago, were the speakers from off the campus.

Persons interested in the organization and work of Parent-Teacher Associations can secure valuable information from the University Extension Bulletin, Vol. I, No. 10, by the University of North Carolina. The Bulletin is entitled "The Parent Teacher Association" and was prepared by Harold D. Myer, Supervisor of Field Work, School of Public Welfare. While the material was prepared primarily for the people of North Carolina, much of it is equally valuable for any community.

The Iowa State Teachers College (Cedar Falls) has just issued a bulletin "Surveying Rural Schools" by Professor F. D. Cramm. The bulletin presents the results of work which Mr. Cramm has been doing in Iowa during several years. It gives some valuable information concerning one-room and consolidated schools. The findings in the body of the survey and the admirably summarized conclusions will commend the bulletin to county superintendents and to those who in any way have to do with educational work in rural units.

The October number of the *Education Bulletin*, published by the State Department of Public Instruction in New Jersey, is devoted to the mental classification of pupils. It reports the organization of a committee appointed

to study the need of unifying the work of educational measurement. The committee recommends, as a minimum program of state-wide intelligence and achievement testing, that in each cooperating district all children in the first half of the fifth grade be examined with a standard set of verbal and non-verbal intelligence tests combined with a reading and an arithmetic achievement test. These tests have been selected or devised and it is expected that approximately 40,000 children will participate.

Doctor C. W. Washburn, Superintendent of Schools, Winnetka, Illinois, has been granted funds by the Directors of the Commonwealth Fund for a four-months investigation of European Experimental Schools. Dr. Washburn will represent the Superintendent of Public Instruction of his state and report to the United States Bureau of Education. His work in individual instruction in the Winnetka Schools and his researches concerning the proper content of the social sciences, attracted the attention of the directors and resulted in their sending him on this mission.

The General Education Board has appropriated $50,000 more to the American Classical League to be used in completing its survey of classical education in American secondary schools. Some 7,000 teachers and 125,000 children in about 750 schools distributed through every state in the Union are cooperating in this study. It is a free-will offering unmatched in the educational history of our country and the results should be far-reaching in their effect.

The Public School Publishing Company (Bloomington, Illinois) has recently published the Coxe Quotient Chart, a chart for finding intelligence quotients devised by W. W. Coxe. It is a graphic sheet with chronological ages by months indicated along one margin and mental ages along another. I.Q. curves appear as oblique lines, and the numbering is such that the I.Q. is very quickly found for any combination of mental and chronological age.

Some New York papers recently carried a statement to the effect "that in order to insure night-school attendance, not only have the attendance records been padded but pupils have been inveigled into attending by offers of ice cream and cake." Superintendent Ettinger has ordered a thorough investigation of the accusations, although he is inclined to treat them facetiously. He says frankly that he does not believe there is any truth in them. New York City is in a class by itself both in the extent of the night-school work offered and in the number of people attending these classes. It would be nothing less than a calamity if newspaper comment or malicious party politics were to influence the people of the city or the Board of Estimate to limit in any degree this form of education.

In 1921 Stanford University received a grant of $20,300 from the Commonwealth Fund for a study of gifted children, to be conducted by Lewis M. Terman. During the school year 1921-22 approximately 1,000 children of the desired degree of superiority were located and extensive data concerning

them were secured. This grant has now been supplemented by a second grant of $14,000 from the same source, on the condition that Stanford University contribute an equal amount, which it has agreed to do. The second grant is chiefly for the purpose of securing medical, anthropological, and additional psychological data on the subjects which have already been located, but part of the sum is being devoted to a parallel biographical study of the childhood of men and women of genius. The total cost of the Stanford investigation will be in the neighborhood of $50,000.

A committee consisting of teachers, principals, and the superintendent of the Columbus (Ohio) public schools recently presented a report on school finance. It shows that the budget expenses for the current year are in excess of the school revenue by over $300,000. After examining the situation carefully, the committee submits a series of recommendations with suggested lines of investigation which may result in economies. Principals are urged to scrutinize carefully expenditures for water, light, heat, and supplies. It is further suggested that comparisons between buildings be made on the basis of cost per pupil. It is also intimated that a number of janitors might be employed, as teachers are, on less than a twelve-months basis. Statements are submitted indicating that economy might result by simplifying the landscaping plans which are being carried out at some of the buildings. Principals seem to recognize that playground space is quite as important as landscaping effect.

Mr. T. L. Torgerson, Director of Educational Research, West Allis, Wisconsin, is giving a course in tests and measurements to the teachers of that city under the direction of the Extension Division of the University of Wisconsin. Credit will be given for this work. Dr. W. W. Theisen, Assistant Superintendent of Schools, Milwaukee, is giving a course in the improvement of instruction to the teachers of that city under a similar arrangement with the State University.

The gist of a recent article in the *New York Evening Mail* is worthy of being passed on to the consideration of school people everywhere. And it would be worth while if school superintendents and principals would see that the information is placed in local papers everywhere for the consideration of the tax-paying public. Using data secured by the Research Department of the N. E. A., the writer shows that at no time has as much as two percent of the national income been given to the support of elementary and public high schools, and that it has rarely been in excess of one and one half percent. The writer asks the following pertinent question: Is one and one half percent of the community's income too much to be spent on the education of its children? Educational expenditures have not kept up with the increase in national income. Our fathers of one and two decades ago were spending a greater proportion of their income for education than we have been spending during the past few years. If they could afford it, cannot we?

The following figures taken from the Annual of Yale University will be of interest to all public school people. "Ranking scholars at Yale are those having a general average of eighty percent or above in their studies, sixty per cent being the passing mark.

	Public School	Private School	Tutor
Number entering	164	311	90
Ranking scholars	20%	11%	0%
Left because of low standing	8%	10%	39%
General average for those finishing	74%	70%	63%

A fair inference is that so far as those entering Yale are concerned the quality of the student body in the public high schools is superior to that in private schools.

Our readers will be interested in the continuous check upon the location of the homes of public school pupils afforded by the pin map which Superintendent C. P. Lynch of Lakewood, Ohio, is keeping. Pins of one color indicate elementary children, those of another color junior high-school children, and those of a third color senior high-school children. Such a map, if kept continuously up to date and photographed at regular intervals, will afford a splendid record of the movements of population. This in turn will have intimate bearing upon the building program as well as upon the altering of district lines. The whole question of utilizing to the best advantage the existing plant is simplified by such a record. We suggest, however, that in view of the undoubted value of a series of photographs, the pins should be of such a character as to be distinguished when a plate is made from the photographer's negative.

The Cleveland salary schedule, according to a bulletin lately received, provides the following minima and maxima for teachers:

Elementary school, $1,200 to $2,880
Junior high school, 1,350 to 3,240
Senior high school, 1,500 to 3,600
School of Education, 1,800 to 3,900

The determination of a teacher's salary within these ranges depends in part on his experience and in part on the extent of his training.

Elementary principals are grouped according to the number of teachers they supervise as well as on the basis of educational qualifications. The minimum thus varies from $2,400 to $2,970, with corresponding maxima of $3,360 to $4,170. Junior high-school principals are in two classes on the basis of the number of pupils. These classes range through the same differentiation as to educational qualifications. Similar qualifications are made for senior high-school principals except that there are three classes on the basis of size of school. Those interested in complete information regarding the salaries at Cleveland can doubtless receive the bulletin by addressing the Superintendent of Schools.

A brief study of the relative progress of groups sectioned on the basis of ability under the direction of Dr. W. W. Theisen while director of research in Cleveland last year brought forth the following observations: (1) As a rule the sections that made high intelligence scores in each school excelled in scholarship—for example (*a*) in reading comprehension nine of the thirteen best sections and only one of the twelve poorest sections reached the standard, (*b*) in arithmetic eleven of the best and three of the poorest reached standard, (*c*) in language ten of the best and only one of the lowest reached standard. (2) In general the brighter sections were made up of younger children. Only five of the best sections averaged 12.5 years or older, while eleven of the twelve poorest were of that age. (3) Grouping by intelligence or mental maturity does not eliminate the necessity of good teaching to bring out the best results. (4) Foreign parentage and consequent language handicaps may have entered into the results to some extent. (5) The correlation of achievement test records with intelligence test scores on 200 pupils selected at random were 0.50, 0.44, and 0.37 for arithmetic, reading comprehension, and language, respectively.

Dr. Theisen concludes that the results afford sufficient justifications for the policy of grouping children on the basis of ability and states that the next problem is to care adequately for the different groups.

A system of personnel research has been inaugurated in the Pasadena (California) schools through the cooperation of the Department of Child Welfare and the Department of Educational Research. An attempt is being made to secure a complete physical examination, psychological and achievement record, social data, and ratings on capacities, attitudes, and interests. These ratings will be on a point scheme from zero to two hundred in a five-division arrangement on the following items:

Capacity—

1. Quickness of thought.
2. Strength and control of attention.
3. Retentiveness of memory.
4. Force of personality.
5. Capacity for group leadership.

Attitudes—

1. Regularity and persistency.
2. Trustworthiness.
3. Sense of accuracy.
4. Confidence in own ability.
5. Initiative and aggressiveness.
6. Respect for authority.
7. Cooperation in group activities.

Special Interests—

1. Social.
2. Executive.
3. Literary.
4. Scientific and mathematical.

5. Mechanical and constructive.
6. Expressive.
7. Artistic.
8. Musical.
9. Home-making.

We shall await with interest any report which Pasadena may make on this personnel study.

It is impossible for most of us to understand fully the public school situation in New York City. Its very magnitude overwhelms us. At the same time, comparative figures may make trends equally obvious to all. The following data taken from *The Public and The Schools* of October 21 can be easily interpreted, at least so far as their tendency is concerned. The tabulation shows the number of children receiving part-time schooling in day elementary and high schools for the years indicated:

1918— 38,165
1919— 52,280
1920— 83,728
1921—122,977
1922—153,166

New York City places children upon half-day sessions for the same reason that operates in any other city in the country, namely, because there are more children than there are seats in the public schools. That these numbers have increased more than four-fold in five years shows clearly that New York City, along with many other cities, has been unable to keep pace with its growing population in the matter of school buildings.

The superintendent of schools has appointed a group of committees to work on a survey of educational problems within the school system. Dr. Ettinger is showing himself especially anxious that the schools and the communities shall, as he says, "face the facts" and that the city shall employ the policy needed to take care of the situation.

The report of Mr. Nifenecker, Director of the Bureau of Statistics, which shows 24.5 percent of the pupils over age and retarded together with the fact that the promotion rates for fall and spring term 1920-21 were 87.6 percent and 88.6 percent, respectively, indicates one of the places at least to which attention must be given. Over-size classes, part-time instruction, late entrance, illegal attendance, physical difficulties, mental disabilities, etc., are listed as causes for these conditions. Whatever the cause, however, the important thing is that the schools must provide effective, economical education for all the children regardless of what adjustment may be necessary in curriculum, method, buildings, or administration.

The New Jersey Composite Test

As the result of the appointment of a classification committee by John Enright, commissioner of education of New Jersey, a composite test has been devised. It was decided to make a state-wide standardization of the test in order that comparisons might be made from school to school within the state,

and that diagnoses might be especially representative of the population of New Jersey. The composite test consists of an intelligence section of two parts—three verbal tests and four non-verbal tests—and an achievement section which includes three types of reading tests and three tests in the fundamental arithmetical processes. A full equipment of accessory materials is provided, giving specific forms and directions for administering, scoring, and reporting. It is worth noting that the non-verbal intelligence test is the Myers' Mental Measure. Permission to use this test was given to the New Jersey committee. The verbal part of the intelligence test was devised by Mr. Roy L. Shaffer and was patterned after the Army Alpha Examination. The sub-tests are in arithmetical reasoning, vocabulary, and information. The achievement tests in reading were devised by Miss Vera Telfer, and the arithmetic test by Mr. Elmer K. Sexton. An interesting write-up of the nature and purposes of the New Jersey composite test is contained in the October issue of the *Education Bulletin*. It may properly be added that this bulletin is issued by the New Jersey Department of Public Instruction, and that the issue to which we are referring is devoted to the mental classification of pupils.

Professor Rusk on Dr. Bagley and "Educational Determinism"

Anent the controversy on "Educational Determinism" the following from Professor Rusk of the University of St. Andrews, Scotland, is quoted from the issue of *School and Society* for October 14, 1922.

In Professor Bagley's article on "Educational Determinism" which appeared in an April issue of this journal he quoted the *Highway*, which quoted the *Pall Mall Gazette*, which misquoted or misinterpreted what I said in a lecture on "The Supernormal Child" in London in January. Any further reply to the personal reference in his article is unnecessary, but on the wider issues a word is advisable.

Professor Bagley's attack on those whom for his own purpose he designates "determinists," is but one more chapter in the old educational quarrel between initial equality and initial inequality, between the views that the influence of education is limited and that it is unlimited, and he comes by his selection of instances of inspired teachers and exceptional pupils perilously near setting all teachers the task of making a silver purse out of a sow's ear. His fear that the developments of mental testing threaten the entire theory and practice of democratic education argues a misunderstanding of mental testing or the ideals of democratic education or of both. It will indeed be a sad day for democracy when democratic ideals are incompatible with scientific progress. It is not the democratic but the conservative like Plato with his caste system of education that lives in constant dread of innovations in education.

Democratic education in my opinion demands that each child should receive the education by which he can most benefit irrespective of his social position, and mental testing, as I understand it, is contributing to the attainment of this end. Democratic education does not surely demand, as any one wil-

fully misinterpreting Professor Bagley's article might conclude, that every mentally defective child should be subjected to a university training. That there are differences in mental abilities and that these set limits to the influence of education, have always been recognized by practical teachers, whatever a professor of education for the sake of argument avers. All that the mental testers have done is to give precision to these differences by expressing them in percentages. By the use of mental tests, in addition to the usual scholastic tests, they have broadened the basis of selection of pupils for secondary (i.e., high school) education, thus affording children who have not had the best early educational opportunities a chance of displaying their abilities—surely not an undemocratic proceeding. By segregating children of the lower mental grades who are not benefiting by ordinary schooling and suggesting that a more practical type of education should be afforded them, the mental testers in this country are hoping to give such children a chance of developing self-respect. In suggesting that their education should be of an extensive rather than of an intensive type[1] the writer has evidently anticipated Professor Bagley. What the length of the school life should be, is a matter dictated by social, i.e., political and economic, considerations; at present in Scotland the leaving age is fourteen, and according to a recent act not yet enforced, fifteen, so that in maintaining that certain children can not benefit by the mathematical and linguistic courses of a secondary school the mental testers in Scotland do not thereby imply that these pupils should have no further education after the age of twelve; they merely advocate that these pupils should have an education which will be a benefit to themselves and to the community.

The democratic ideal in education is evidently by some educationists conceived to be merely the old aristocratic ideal generalized. To generalize a proposed course of action is, as Kant has taught us, a test of its validity, but to remove the exclusiveness of a wrong type of education does not make it right. Democracy must work out its own educational salvation and its own educational aims, and some of its defenders with but little faith are not democratic enough to recognize that culture and opportunities for self-realization are not restricted to classics and the higher mathematics; from their lofty standpoint they look with pity on the hewers of wood and drawers of water praying for the day when these labors will be performed by a pure act of thought; meanwhile the true democrat recognizes that in a democratic community all, whatever their I.Q.'s should be hewers of wood, although some may be hewing it from the tree of knowledge.

[1] P. 26 of abstract of lecture on "The Supernormal Child" in *The Child-Study Yearbook for 1921*.

Educational Research Association

(Frank N. Freeman, *Secretary and Editor*)

Progress in Arithmetic in Kansas City, Missouri

Reported by George Melcher
Assistant Superintendent in charge of Research and Efficiency

The marked gain in arithmetic which may be produced by the use of standard tests is well illustrated by the following extracts from a report made by Mr. Melcher.

We are glad to send to you the results of the work in the fundamental operations in arithmetic last year. An examination of these scores will show you that the results last year are the best that we have had at any time in the system. When you compare the results in May, 1922, with the results in Kansas City in 1915, you will find 85.5 percent improvement.

In Attempts or Speed, the median of the city is up to standard or above in every operation in every grade. In Rights, all the A classes in every grade and in every operation were up to standard with the exception of multiplication in the sixth grade. The B classes were up to standard in Rights in the majority of the cases.

In May, 1920, 42.5 percent of all the classes of the city scored below normal; again in May, 1921, 42.5 percent of all the classes scored below normal; however, in May, 1922, only 24.6 percent of the classes scored below normal or, reversing this, 75.4 percent of the classes were normal or above last May. From this report it is evident that the majority of our teachers have mastered the technique of teaching the fundamental operations. These results demonstrate without question that the standards are not too high. Teachers in schools in other cities, especially New York and Boston, have attained as high and even higher levels than we have in Kansas City.

Every teacher should aim to reach the standard. Slow classes should reach the lowest normal score in each grade, average classes should reach the standard, and strong classes may score somewhat above standard. However, it is advised that classes should not exceed the upper normal scores in any grade. We had a large number of classes last year that did exceed the upper normal score.

When a class has attained the standard score for its grade, the amount of drill work should be reduced to such a minimum as will only maintain the

TABLE I. THE PERCENTS OF CLASSES NORMAL, BELOW NORMAL, AND ABOVE NORMAL IN 1919, 1921, AND 1922

	Below Normal			Normal			Above Normal		
	1919	1921	1922	1919	1921	1922	1919	1921	1922
Addition	73.7	40.7	18.9	18.7	27.5	27.5	7.6	31.8	53.6
Subtraction	45.0	45.2	24.1	42.7	35.0	41.5	12.3	19.8	34.4
Multiplication	50.7	46.1	32.5	39.4	37.5	38.3	9.9	16.4	29.2
Division	41.7	38.4	22.8	41.6	38.4	34.8	16.7	23.2	42.4
Total	52.8	42.5	24.6	35.6	34.7	35.5	11.6	22.8	39.9

TABLE II. THE PERCENT OF CLASSES THAT ARE BELOW NORMAL, NORMAL, AND ABOVE NORMAL FOR EACH OPERATION AND EACH GRADE, MAY, 1922

	Below Normal	Normal	Above Normal
Fourth Grade	26.9	38.0	35.1
Fifth Grade	27.3	37.2	35.5
Sixth Grade	24.2	33.7	42.1
Seventh Grade	19.4	32.8	47.8
Total	24.6	35.5	39.9

TABLE III. COURTIS RESEARCH TESTS—PERCENT OF GAIN OF 1922 SCORES OVER 1915 SCORES

	Fourth Grade	Fifth Grade	Sixth Grade	Seventh Grade	Average of Each Operation for the Four Grades
ATTEMPTS					
Addition	67.8	67.1	63.9	71.3	52.5
Subtraction	51.6	48.7	38.9	43.3	45.6
Multiplication	49.1	42.0	37.3	34.0	40.6
Division	76.3	70.4	54.7	45.7	61.8
Average for each grade—four operations	61.2	57.1	48.7	48.6	53.9
RIGHTS					
Addition	117.7	120.9	105.5	101.6	111.4
Subtraction	97.2	84.6	64.8	57.6	76.1
Multiplication	75.8	82.6	49.2	40.0	61.9
Division	143.5	90.0	76.2	60.2	92.5
Average for each grade—four operations	108.6	94.5	73.9	64.9	85.5
PERCENT OF ACCURACY					
Addition	29.3	30.7	25.7	18.3	26.0
Subtraction	30.2	23.2	18.7	9.8	20.5
Multiplication	17.7	28.3	9.6	5.2	15.2
Division	37.7	12.2	14.3	10.0	18.6
Average for each grade—four operations	28.7	23.6	17.1	10.6	20.1

skill already attained. Last year we sent a list of 18 schools in which the work was reported as excellent. This year we are reporting to you 37 schools in this excellent list. This is about one-half of the white elementary schools.

Several of these schools have ranked "excellent" for a number of years. Some of them did not lapse even when the schools were interrupted by the War and the influenza epidemic. While this group of schools ranks "excellent," there is a second group of 21 schools that ranks "good," and a small group of 12 schools that ranks "poor." To avoid humiliation for the "poor" schools, we refrain from publishing the list of "good" and "poor." Any principal requesting it will be given the ranking of his own school. It is possible for every school to enter the "excellent" list. It is certainly commendable that there were only 12 white schools in the system in 1921-22 that did "poor" work in the fundamental operations in arithmetic.

Eleven schools had every class normal or above in every operation this year. Seventeen had more than 90 percent and less than 100 percent of their classes normal and above normal. Seven schools had more than 80 percent and less than 90 percent of their classes normal and above normal.

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The Ohio State University has adopted the quarter plan of organization, which divides the work of the year into smaller units than formerly and provides for greater flexibility and variety of adjustment. Students are enabled to enter at the beginning of, or obtain degrees at the end of, any quarter. Teachers in service will find the two-term Summer Quarters especially convenient.

Dates of Quarters During 1922-23

Autumn Quarter	-	**October 2 to December 22, 1922**
Winter Quarter	-	**January 2 to March 23, 1923**
Spring Quarter	- -	**March 26 to June 8, 1923**

Summer Quarter (two terms)—dates to be announced later

ACADEMIC SUBJECTS

Work in all the standard academic branches (Languages, Fine Arts, History, Mathematics, etc.) is provided for students in the College of Education by other Colleges of the University. This includes courses given from the standpoint of content and courses in methods of teaching the various subjects.

PROFESSIONAL SUBJECTS

Certain departments classed as "professional" are especially *devoted to the task* of providing teachers and public school administrators with the technique and philosophy essential to the public school service. These include: Principles and Practice of Education (offering 45 courses), Industrial Education (17 courses), History of Education (16 courses), School Administration (31 courses), Psychology (at least 13 of its 39 courses are definitely professional), Vocational and Commercial Education (17 courses).

These facilities make possible the certification privileges which accrue to graduates of the College of Education. Students completing the general curricula are entitled to a State Provisional Certificate to teach in any Ohio high school. The College also provides curricula which lead to Special State Certificates in Fine Arts, Home Economics, and Manual Training.

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In addition to its functions as a Research Station, the Bureau affords students an opportunity to pursue, under the auspices of the Bureau staff, resident courses of two types: (a) for advanced undergraduates and graduates. Minor Problems; (b) for graduates Major Research, or Major Research Problems. Such courses are listed among the offerings of the Departments of School Administration, Psychology, and Principles and Practice of Education.

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For information address:

The Dean of the College of Education

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